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Annual report on the experimental work of the Ganeshkhind Botanical station.

Annual report on the experimental work of the Mirpurkha's Agricultural station.

Annual report on the experimental work of the Manjri Agricultural station and the Baramati Demonstration station.

Annual report on the experimental work of the Nadiad agricultural station.

Annual report on the experimental work of the Poona Agricultural station including Kirkee civil dairy and Lanowli Agricultural station.

Annual report on the experimental work of the Surat Agricultural station.

1906-1907.

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Department of Agriculture, Bombay.

ANNUAL REPORT

ON THE

EXPERIMENTAL WORK

OF THE

DHULIA AGRICULTURAL STATION

(West Khándesh District, Deccan)

FOR THE YEAR

1906-1907

BY

F. FLETCHER, M.A., B.Sc., ETC.,

Deputy Director of Agriculture.

BOMBAY

PRINTED AT THE GOVERNMENT CENTRAL PRESS

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Vernacular names of crops, &c, mentioned in the report with their Botanical and English equivalents.

Botanical.	English.	Vernacular.
Cereals.		
Andropogon sorghum var vulgare ...	Great millet ...	Jowár (Mothi, Gudghi, Chapti, &c.).
Pennisetum typhoideum ..	Bulrush millet ...	Bájri.
Triticum sativum ...	Wheat ...	Cahu (Moondi, Bansi, Bakshi, Kátha, Kempugodhi, &c.).
Hordeum vulgare ...	Barley ...	Sátu, Jav.
Avena sativa ...	Oats ...	.....
Pulses.		
Cajanus indicus ...	Pigeon-pea ...	Tur.
Cicer arietinum ...	Gram ...	Harbhara.
Phaseolus radiatus ...	Black gram ...	Udid.
.....	Saidi beans ...	.....
Oilseeds.		
Sesamum indicum ...	Sesamum ...	Til.
Arachis hypogea ...	Groundnuts ...	Bhuimug.
Fibre plants.		
Gossypium neglectum ...	Khándesh cotton ...	Kápus (Jari, Vadi).
Do. indicum ...	Hinganghát cotton ...	Kápus (Eani).
Do. herbaceum ...	Gujarát and Karnátak cotton .	Kapás (Broach, Goghári, Lálio, Kumpta).
Do. hirsutum ...	Dhárwár—American cotton ...	Viláyati-Hatti.
Condiments.		
Capsicum fruitescens ...	Chillies ...	Mirchi.
Sugar.		
Sachharum officinarum ...	Sugarcane ...	Us (Gul).
Vegetables.		
Solanum melongena ...	Brinjal ...	Vángi.
Do. tuberosum ...	Potatoes ...	Batata.
Hibiscus esculentus ..	Edible hibiscus ...	Bhendi.
Fodders.		
Medicago sativa ...	Lucerne. ...	Alfalfa, Lasunghás.

M739100

THE DHULIA AGRICULTURAL STATION, 1906-07.

Established—1905; *North Latitude*—21° 10′; *East Longitude*—75° 20′; *Elevation*—844 feet above sea level; *Soil*—medium black; *Average rainfall*—22′ 40″; *Temperature*—maximum 114° in May; minimum 36° in January.

Area—28½ acres.

Superintendent—Mr. Mohoniráj G. Athalye.

Season.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-07)	0 0	0 0	7 77	5 63	7 19	2 24	0 16	...	...	...	0 32	...	23 31
Average	0 03	0 06	3 90	5 77	3 97	6 28	1 19	0 74	0 14	0 15	0 03	0 14	22 40
Temperature (1906-07)—													
Mean maximum ...	105°	108°	96°	91°	87°	88°	92°	91°	90°	88°	88°	97°	...
Mean minimum ...	67°	71°	71°	70°	67°	66°	62°	56°	47°	45°	46°	55°	...

2. The monsoon began earlier than ususal.

The germination of cotton sown after the first showers was checked to a certain extent by subsequent continuous and heavy downpours and the seedlings looked pale. In the first fortnight of July cotton gained a healthy appearance and gathered vigour. Later rains much interfered with the interculturing operations. Rains in August proved very injurious to early sown Bájri inasmuch as they washed off the inflorescence and left earheads grainless.

The failure of October rains spoiled the grain formation of Tur and caused a partial loss of the crop.

On the whole the season was favourable to cotton and Jowár, but less so to Bájri aud Til and still less to Tur and late Jowár varieties.

It was also very favourable to insect life. There were several generations of harmful cotton pests, root worms and borers, all of which did considerable damage to the food crops.

Manurial Experiments.

3. The chief work of the station is the improvement of the local cotton. Incidentally a few manurial experiments were made. These consisted in the treatment of (1) cotton with ammonium sulphate, farm-yard manure and lime in comparison with no manure and of (2) wheat with ammonium sulphate and farm-yard manure separately and with both combined. In the case of cotton the quantity of farm-yard manure applied was adjusted in such a way that its cost was kept nearly equal to that of the special fertilizer.

The results are as below :—

Number of plot.	Area.	Variety of Cotton.	Drill.	Average per Acre.				
				Manure applied.	Yield of seed cotton.	Value of produce.	Cost of cultivation	Net profit.
	A. g.				Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
2	0 30	Khandesh.	18″	None	740	67 4 4	21 9 5	45 10 11
3a	0 20			Farm-yard manure 7½ tons ...	908	82 8 9	32 10 0	49 14 9
3b	0 20			Ammonium Sulphate 1 cwt. ...	714	64 14 6	30 8 2	23 6 4
24c	0 10			Slaked lime 2,100 lbs.	406	36 14 6	28 4 6	8 10 0

Ammonium sulphate prolongs the vegetative period and so the late formed bolls remain imperfectly developed and do not open freely in the succeeding cold season. In the above results farm-yard manure has shown a decided advantage over ammonium sulphate, which fact is corroborated in the following results of wheat experiments:—

Serial number of wheat plot.	Area.	Variety of wheat.	Average per Acre.					
			Manure applied.	Number of waterings.	Quantity of water.	Yield of grain.	Stalks and chaff.	Value of produce.
	A. g.				C. ft.	Lbs.	Lbs.	Rs. a. p.
21	0 1	Bansi.	Ammonium Sulphate 1 cwt. ...	4	83,200	300	680	15 14 5
22	0 1		Farm-yard manure 5 tons and Ammonium Sulphate 1 cwt. ...			335	680	17 15 9
23	0 1		Farm-yard manure 5 tons ...			560	880	27 11 9
24	0 1		Ammonium Sulphate 1 cwt. ...	5	109,120	800	1,360	40 2 2
25	0 1		Farm-yard manure 5 tons and Ammonium Sulphate 1 cwt. ...			840	1,320	41 9 7
26	0 1		Farm-yard manure 5 tons ...			880	1,400	43 10 8

Rotation Experiments.

4. No permanent rotation series has yet been introduced here. However the distribution of this year's crops was done in accordance with local rotations. The results obtained are given below :—

Number of plot.	Area.	Previous crops.	The crop rotated.	Average per Acre.		
				Principal product.	By product.	Value of produce.
	A. g.			Lbs.	Lbs.	Rs. a. p.
2	0 30	Jowár	Cotton ...	740	...	67 4 4
4*b*	0 20	*i* Bájri ... . / *ii* Gram failed	Do. ...	996	...	90 8 8
12*a*	0 10	Bájri	Gram ...	160	188	7 1 4
12*b*	0 10	Udid	Do. ...	104	160	4 12 9
12*c*	0 10	Fallow	Do. ...	276	376	12 8 0
17*i*	0 1	Jowár	Wheat ...	680	1,160	33 0 0
17*ii*	0 1	Bájri	Do. ...	880	1,800	44 3 2
17*iii*	0 1	Fallow	Do. ..	920	1,880	46 3 2

The results indicate that Bájri is preferable to Jowár as a preparation for cotton and irrigated wheat and that a dry-crop of gram can also be more profitably grown after kharif Bájri than after Udid.

The following table shows results of simultaneous rotations of Udid, Jowár, Til and Tur :—

Plot.	Area.	Crop.		Average per Acre.				
		Principal.	Subordinate.	Seed rate.	Principal product.	By product.	Value of produce.	Cost of cultivation.
	A. g.				Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
14*b*	0 20	Udid ...	Jowár as sprinkling ...	Udid 6 lbs. ... / Jowár 2 lbs. ...	412 / 1,374	480 / 3,270	64 15 8	28 12 8
25*a*	0 20	Jowár ...	Udid mixed	Jowár 6 lbs. ... / Udid 2 lbs. ...	1,408 / 60	5,690 / 140	59 7 0	28 7 3
25*b*	0 20	Do. ...	2 rows of Udid after every 4 rows of Jowár.	Jowár 6 lbs ... / Udid 2 lbs. ...	1,274 / 64	4,860 / 260	53 9 2	17 0 8
26	0 20	Do. ...	Alone	Jowár 8 lbs. ...	1,302	6,256	54 15 8	19 13 10
24*a*	0 20	Til ...	Tur mixed	Til 4 lbs. ... / Tur 8 lbs. ...	468 / 252	... / 324	46 10 0	20 14 4
24*b*	0 20	Do. ...	2 rows of Tur after every 4 rows of Til.	Til 4 lbs. .. / Tur 8 lbs. ...	692 / 72	... / 108	56 5 4	18 6 4

A mixed crop of Udid with Jowár as a sprinkling appears to be more productive than any other mixture or Jowár alone, and Til and Tur in separate rows appears to be better than both grown mixed.

Cultural Experiments.

5. Wide and narrow drilling and thinning of cotton were tested with the following results :—

Plot.	Area.	Crop.	Drill.	Tillage.	Treatment.	Average per Acre.			Percentage of fibre to seed cotton.
						Seed cotton.	Value of produce.	Cost of cultivation.	
	A. g.					Lbs.	Rs. a. p.	Rs. a. p.	
4a	0 20	Khándesh cotton,	24″	Ploughed for previous gram.	Thinned ordinarily.	824	74 14 6	15 15	37·1
4b	0 20	Dhulia seed ...	18″			996	90 8 8	17 7 2	36·5
5a	0 20	Khándesh cotton,	18″	Harrowed only	Thinned to 4″ in rows.	850	77 4 4	22 0 8	40·4
5b	0 20	Chopda seed ...	18″		Not thinned.	842	76 8 8	18 3 4	38·8

New Crops.

6. East African Bájri, Virginia groundnuts, barley and alfafa lucerne were the new crops tried this year.

Of these East African Bájri and Virginia groundnuts were successful and yielded at twice the rate of the local varieties. The grain of the former is however inferior, but it is thought that the variety will be useful for breeding purposes.

Barley and oats were grown under irrigation simultaneously with wheat on small half guntha plots. The crops took 6 months and did not mature properly, yielding very poorly.

Saidi beans were grown after Bájri on a small 5 guntha plot. The seed was sown after wetting the land. Germination was good and two more waterings were given afterwards. But the crop after standing 1½ months gradually got rusted inspite of the removal of diseased plants and died away altogether, yielding no grain.

The four varieties of Turkestan Alfalfa (lucerne) were grown to test their drought-resisting property, but they were not found superior to the ordinary variety.

The seeds germinated evenly and plants did well till September when they showed signs of drying. Afterwards the crop was irrigated whenever the plants appeared to require it, care being taken not to supply water unless it was absolutely necessary to keep them alive. Till November the crop was poor, but afterwards in the cold season it flourished.

The detailed results are tabulated below :—

Plot.	Area.	Crop.	Average per acre.		
			Principal product.	By product.	Value of produce.
	A. g. a.		Lbs.	Lbs.	Rs. a. p.
19	0 5 0	Bull rush millet	2,240	6,248	68 8 0
21a	0 15 5	Virginia groundnuts	2,157	4,129	118 11 1
21b	0 9 5	Local groundnuts	1,128	4,501	62 12 7
14	0 0 5	Barley	145	2,880	.....
	0 0 5	Oats	260	1,040	.....

A statement showing dates of sowing and irrigating the crop of Lucerne is given below :—

Plot.	Area.	Crop.		Date of sowing.	Dates of waterings.										Weight of crop.	
		No.	Name.		1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	1st.	2nd.
	A. g. a.														Lbs.	Lbs.
19	0 1 5	12331	Turkstan Alfalfa.	27-6-06	21-9-06.	22-10-06.	16-11-06.	11-1-07.	25-1-07.	26-2-07.	10-3-07.	17-3-07.	22-3-07.	29-3-07.	19	50
		13999													26	57
		18391													22	83
		18425													27	58

Varietal Experiments.

7. Several varieties of Jowár, Bájri, cotton and wheat were grown for comparison and the results are as follows :—

Plot.	Area.	Crop.		Average per acre.			
		Name.	Variety.	Principal product.	By product.		Value of produce.
					Stalks.	Chaff.	
	A. g.			Lbs.	Lbs.	Lbs.	Rs. a. p.
11*a*	0 20	Bájri ...	Nadiád	814	2,720	...	34 8 0
11*b*	0 20		Local	852	1,710	...	30 12 2
10	1 0	Cotton	Bani	276	...	...	25 1 0
15	1 0	Do.	Comilla	325	...	...	40 10 0
16	1 0	Do.	Khándesh ...	987	...	...	89 11 8
21	0 8	Do.	Broach	80	...	...	8 0 0
	0 8	Do.	Kumtha ...	66	...	...	6 9 7
	0 3	Do.	Goghári... ...	93	...	...	9 4 9
26*a*	0 20	Jowár	Mothi	1,302	5,840	416	54 15 8
26*b*	0 20		Gudghi	906	5,120	320	37 12 10

The results of wheat are as under :—

Plot.	Area.	Name of Wheat.	Number of waterings.	Average per acre.		
				Grain.	Straw and chaff.	Value of produce.
	A. g.			Lbs.	Lbs.	Rs. a. p.
	0 1	Moondi	5	1,275	1,800	64 6 11
	0 1	Bakshi		560	1,720	31 14 11
	0 1	Bansi		800	1,320	39 14 11
	0 1	Kátha		1,120	1,760	48 9 8
	0 1	Kempu		372	680	18 4 10

Mothi Jowár, Khándesh cotton and Moondi wheat have given the highest yields.

Ginning Experiments.

8. Several varieties of Indian cottons were also grown—a few plants of each—to ascertain the percentages of fibre to seed cotton.

The following are their ginning outturns :—

No.	Name.	Percentage of lint to seed cotton.	No.	Name.	Percentage of lint to seed cotton.	No.	Name.	Percentage of lint to seed cotton.
1	Broach ...	32·03	5	Wágad ...	27·3	9	Bani ...	26·5
2	Kumtha ...	25·0	6	Mathio ...	29·3	10	Comilla ...	44·8
3	Goghári ...	37·5	7	Jari	30·2			
4	Naden ...	29·6	8	Varádi ...	35·9			

9. An experiment consisting of the analysis of a field of Khándesh cotton into several types was conducted.

The number of plants found, yield of seed cotton and percentage of lint of each of the types are given in the following table :—

Name of cotton analysed.	Name of type.		Average per acre.		Percentage of lint.
	Common.	Latin.	Number of plants.	Yield of seed cotton.	
				Lbs.	
Khándesh Cotton, Dhulia seed.	1 Jari *a*	G. Neglectum Vera ...	1,190	30	31·6
	2 Jari *b*	G. N. V. Malvensis ...	200	1½	25·0
	3 Jari *c*	G. N. V. Kathiavarensis ...	5,190	90	28·5
	4 Varádi *a*	G. N. Rosea	12,850	310	38·7
	5 Varádi *b*	G. N. R. Cutchica	14,320	420	35·7
	6 Bani	G. Indicum	190	1¼	24·2
			33,940	852	

Varádi is the predominating type forming nearly 80 per cent. of the crop. Its ginning outturn is also the highest. Nos. 2, 3 and 6 produce cotton worth about 3 per cent. more than the rest which, however, form the greater part of the mixture owing to their heavier ginning outturn.

On Crop Breeding.

10. 91 varieties of indigenous cotton crosses were grown, of which some were retained and their seed preserved for next season.

The numbers selected and the quantity of seed obtained of each are as below :—

Serial No.	Number of cross.	Quantity of seed from selected bolls.	Serial No.	Number of cross.	Quantity of seed from selected bolls.	Serial No.	Number of cross.	Quantity of seed from selected bolls.
		Lbs. oz.			Lbs. oz.			Lbs. oz.
1	1,074	0 1	20	1,133	0 2½	39	1,161	0 ¼
2	1,079	0 2	21	1,134	0 2	40	1,162	0 2
3	1,085	0 ½	22	1,136	0 2½	41	1,163	0 3½
4	1,089	0 2	23	1,137	0 2	42	1,164	0 4½
5	1,093	0 1½	24	1,140	0 2	43	1,165	0 1¾
6	1,096	0 8	25	1,141	0 2	44	1,200	0 3¾
7	1,097	0 2	26	1,142	0 ½	45	1,201	11 4
8	1,101	0 1½	27	1,143	0 1	46	1,202	0 3
9	1,108	0 6	28	1,145	0 1	47	1,205	0 1½
10	1,111	0 5	29	1,146	0 2½	48	1,206	0 2
11	1,112	0 ½	30	1,147	0 2	49	1,228%	0 ¼
12	1,113	0 ½	31	1,149	0 ½	50	1,232 V/G	0 1¾
13	1,122	0 1½	32	1,151	0 ¾	51	1,232 O/G	0 1
14	1,125	0 5	33	1,152	0 2	52	1,234 O/G	0 ½
15	1,127	0 2	34	1,154	0 3¼	53	1,235	0 1
16	1,128	0 2	35	1,157	0 3¾	54	1,293	0 6
17	1,129	0 1	36	1,158	0 2	55	1,312	0 4
18	1,130	0 ¼	37	1,159	0 ½			
19	1,131	0 1½	38	1,160	0 ¾			

Out of these, Nos. 1096, 1108, 1133 and 1201 produced comparatively much finer lint. Nos. 1133 and 1201 were exhibited at the Surat Exhibition for the superior quality of their fibre.

A cross of Dhárwár American and Varádi from Dhárwár station was grown. Most of the plants were attacked by leaf blight. Seed from selected bolls of healthy and prolific plants has been obtained and preserved for next season.

Crosses were also made between rough but dense fibred Comilla and finer and more prolific Jari and Varádi types, and a sufficient number of bolls was obtained for sowing next season.

On Pests.

11. Last season was particularly favourable for the growth of insects and other pests. The following are the more important insects that appeared :—

No.	Common name of insect.	Latin name.	Food plant.	Remedies suggested.
1	Brinjal stem borer ...	Lucinodes Orbonalis .	Brinjal ...	Picking.
2	Cotton leaf hopper ...	Jassidæ family ...	Cotton	Spraying with kerosine emulsion.
3	Pink boll worm ...	.....	Do.	Bhendi as trap.
4	Cotton bud worm ...	Chlorida Obsoleta ...	Do.	.....
5	Wire worms ...	.....	Roots of chillies .	Allow them to collect under pieces of potato placed near plants and then destroy them.
6	Do. ...	.....	Do. of groundnuts.	

In addition to the insect pests there were attacks of fungoid diseases.

American cottons—both annual and perennial—suffered much from rust, while the crop of Saidi beans totally succumbed to rust, though the diseased plants were removed as they appeared. Some damage was done to the cotton crop by wilt.

Irrigational.

12. These experiments were conducted on several varieties of wheat with the object of determining the quantity of irrigation required to produce the heaviest crop.

The results are given in the following statement. It will be seen that the produce of wheat grain has varied in many cases according to the quantity of water and that later waterings produced distinct effects on produce. Moondi has yielded highest for each particular amount of irrigation.

No. of waterings.	Quantity of water in cubic feet.	Moondi wheat.			Bakshi wheat.		
		Yield per acre.		Value of produce.	Yield per acre.		Value of produce.
		Grain.	Straw and chaff.		Grain.	Straw and chaff.	
		Lbs.	Lbs.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.
5	91,424	1,275	1,800	64 6 11	560	1,720	31 14 11
4	64,960	1,200	1,280	58 9 2	440	1,230	24 11 9
3	47,010	605	1,330	33 3 0	147	960	10 15 2
1	16,800	381	720	20 2 11	192	560	10 13 2

No. of waterings.	Quantity of water in cubic feet.	Bansi wheat.			Kátha wheat.			Kempu Godi.		
		Yield per acre.		Value of produce.	Yield per acre.		Value of produce.	Yield per acre.		Value of produce.
		Grain.	Straw and chaff.		Grain.	Straw and chaff.		Grain.	Straw and chaff.	
		Lbs.	Lbs.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.
5	91,424	800	1,320	39 14 11	1,120	1,760	53 9 8	872	680	18 4 10
4	64,960	695	840	33 2 6	702	1,240	34 4 4	192	460	10 0 0
3	47,040	389	640	19 6 4	461	680	21 13 7	185	420	9 8 0
1	16,800	277	520	14 2 2	463	640	21 11 11	175	320	8 9 7

New Implements.

13. The only new implement that received trial was a farm-made winnower.

The machine is economically useful only when there are no natural winds or when these are uncertain. It can winnow about 3,000 lbs. of grain in a day of 9 hours costing per day 8 to 12 annas.

Experiments made off the Station.

14. The sugarcane crop near Chálisgaon belonging to Mr. Garud was treated with the following nitrogenous fertilizers, *viz.*, ammonium sulphate and sodium nitrate singly as well as in combination with different quantities of farm-yard manure.

The special manures were applied in two doses—one before and the other after the first rainfall.

The results are tabulated in the following statement.

Field No.	Plot No.	Area.		Manure applied per acre.			Nitrogen supplied in manure per acre.	Outturn of Gul.		Value of Gul per acre.	Remarks.
		Acre.	Guntha.	Farm-yard manure.	Chemical manure.			Per plot.	Per acre.		
					Lbs.		Lbs.	Lbs.	Lbs.	Rs. a. p.	
1	1	...	10	100 Cart loads.	*Nil* ...	Ammonium Sulphate.	300	972½	3,890	307 15 4	Like last year Ammonium Sulphate has apparently acted as preventive against white ants; for plot 1 was considerably damaged by white ants and the rest were free.
	2	...	10	50 Do. ...	400 ...		232	1,659½	6,638	525 8 1	
	3	...	10	75 Do. ...	...		307	1,496½	5,986	473 14 3	
	4	...	10	100 Do. ...	400 ...		382	229	916	72 8 8	
2	1	...	10	100 Cart loads.	400 ...	Sodium Nitrate.	342	1,037½	4,150	328 8 8	There was no attack of white ants in any of these four plots.
	2	...	10	50 Do. ...	400 ...		192	864	3,456	273 9 7	
	3	...	10	75 Do. ...	400 ...		267	465	1,860	149 14 2	
	4	...	10	100 Do. ...	*Nil* ...		300	318¾	1,275	100 15 0	

Farm-yard manure ... ... ·5 per cent. Nitrogen.
Ammonium Sulphate ... ... 20·5 ,, ,,
Sodium Nitrate ... ... 16·5 ,, ,,

Poona,
September 1907.

F. FLETCHER,
Deputy Director of Agriculture.

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ANNUAL REPORT

ON THE

EXPERIMENTAL WORK

OF THE

GANESHKHIND BOTANICAL STATION

(Poona District, Deccan)

FOR THE YEAR

1906-1907

BY

G. A. GAMMIE, F.L.S., ETC.,
Economic Botanist.

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THE GANESHKHIND BOTANICAL STATION, 1906-1907.

Re-established—1904; *North latitude*—18° 30′; *East longitude*—75° 50′; *Elevation*—1,850 feet above sea level; *Soil*—reddish alluvial deep loam and medium black; *Average rainfall*—32 inches; *Temperature*—maximum 109° in May, minimum 45° in January.

Area—80 acres.

Curator—Mr. G. B. Patwardhan.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-1907) ...	3 31	...	8 73	4 66	3 98	1 82	0 43	2 65	0 1	...	0 18	0 3	25 85
Average	0 88	1 34	6 02	8 53	4 77	4 33	5 13	0 48	0 31	0 01	0 10	0 02	31 92
Temperature (1906-1907)—													
Mean maximum ...	105°	101°	83°	82°	82°	82°	90°	86°	86°	87°	90°	96°	...
Mean minimum ...	67°	72°	72°	71°	69°	67°	63°	55°	55°	53°	55°	61°	...

History.

2. The Botanical Garden at Ganeshkhind was established in 1873 and attached to it was a smaller garden at Hivra in the Junnar táluka. The principal object of these gardens was to supply the Medical Department with drugs.

In 1872-1873 the outturn of the garden included 700 lbs. of senna, 1,300 lbs. of henbane, and 1,036 lbs. of dandelion.

In the same year experiments were made with various artificial manures—nitro-phosphate, citrate, dissolved bones, nitrate of soda, hop manure and superphosphate.

In 1873-1874 experiments were made with European artificial manures, but the result was not satisfactory. It was proved that silt from the drains of the Poona City is a valuable manure, at least equal for one year's crop to dung from oil-cake-fed cattle.

Experiments were also being made in the cultivation of cork-oak trees, but they ultimately proved unsuccessful. Experiments were also made on the growth of fibre for paper.

In 1874-1875 the area under tillage was 57 acres, 7 of which were watered. It was ascertained that prickly-pear made a valuable manure if it was left to rot in a cistern, through which the water of an irrigation channel was led. A fairly successful attempt was made to grow vanilla. Flax was also grown of fair quality, but of excessive dearness.

In 1875-1876 the most important new introductions were *Balsamocarpon brevifolium*—a plant yielding pods useful in tanning, and the Liberian coffee. Cereal crops were raised with a view to selecting the seed.

In 1876-1877 experiments in the production of tasar silk were continued.

In 1877-1878 experiments were carried on with mahogany trees, the seed of which had been sent from Kew Gardens and planted in 1874. The trees could be established if well watered during the first two years.

The blue gum tree (*Eucalyptus globulus*) was found to thrive well for 4 or 5 years and then to die off. Cinchona died in the hot season if planted out. *Taraxacum* was grown with success. The tasar silk experiments were not satisfactory.

In 1878-1879 it was decided by Government that the Gardens should be constituted the recognized chief botanic gardens of the Presidency, and that arrangements should be made for forming in them as complete a collection as possible of the local plants of Western India, a herbarium of which was to be kept permanently on the spot along with a selected library of diagrams and botanical works of reference. Botanical teaching was begun at the end of February 1879 by means of lectures at the Gardens and at the College of Science and Deccan College.

Experiments with Nankin cotton showed that it could not be profitably grown in the Deccan.

In 1879-1880 a room was partially fitted as a herbarium.

Experiments with the thornless prickly-pear, a favourite food, when skinned, for cattle, showed that it grows freely as a fence.

The yield of the forage grass (*Euchlæna luxurians*) seemed nearly the same as that of Guinea grass. A crop sown in November and cut in April gave 16 tons per acre of green forage at one

cutting. Experiments with lucerne grass seemed to prove the French variety superior to the acclimatised. The plant was quite as vigorous, the stalk was more delicate and the seed was only half the weight.

In 1880-1881 a number of full grown specimens of *Albizzia procera*, which had been transplanted in the cold season of 1878-1879, showed satisfactory results.

In 1881-1882 a mangosteen plant from Singápore died from cold in November. Potatoes received from the Secretary of State grew surprisingly well. In May 1882 the carob tree yielded a crop of fully 30 pounds weight of pods, the greater part of which were equal in size to the imported pods.

The herbarium building was altered and repaired and numerous specimens were added.

Experiments were made in collecting the India rubber-yielding milky sap of the *Cryptostegia grandiflora*, a beautiful climber. As the plants could not bear tapping more than twice a year, the yearly acre outturn would be 24 pounds of coutchouc.

(Extract *Gazetteer*.)

Season.

3. The south-west monsoon was satisfactory and the cold weather fall was less than what is usually expected. An excess of rain fell in the hot weather, 3·31 inches being registered during the month of April. The total rainfall recorded in the gauge was 25·85 inches.

Distribution of Soils.

4. The river Mula forms the northern boundary of the Garden, and the plots lying on its bank—7, 8, 9, 10, 11, lower part of 15. and 16—are composed of a great depth of reddish alluvial loam deposited by the successive annual floods. This is an ideal soil for the growth of a great variety of trees and other plants many of which refused to grow on the black soil. A large quantity of this soil is also used for mixing in flower beds, and it is found that vegetables can only be successfully grown on black soil after a heavy admixture of this alluvium. The plot marked "Banana" on the right is very low-lying and is often deeply flooded. It is now utilized for the growth of jute. Plots No. 14 and the upper parts of 15, 16 are of very inferior *murum* soil, and attempts are being made to use the worst patches for the cultivation of fodder grasses and fibre plants. The remainder of the Garden is inter-

mediate black soil, ranging in depth from 2 feet upwards, becoming deeper to the northward.

Indigenous Trees and Shrubs.

5. Specimen plants in Botanical Section No. 7 are doing well, with the exception of a certain number which are intolerant of drought, and these have been transferred to more suitable positions in the Garden.

Rubber Experiments.

6. *Ceara.*—The average increment in girth of the first set of trees planted in July 1903 is 1·27 inches and that of the second set planted in August 1904, 3 inches in the 12 months under report. The heights of these vary from about 15 feet to 30 feet. The following table shows the progressive increments:—

Year.	First set.		Second set.	
	Height.	Girth.	Height.	Girth.
	Ft. inches	Inches.	Ft.	Inches.
1904-1905	4 9	2·75	2	1·25
1905-1906	5 2·5	2·1	6	2·5
1906-1907	...	1·27	...	3

In July a plot of about half an acre was selected and planted with 392 seedlings, 6 by 6 feet apart. These are making satisfactory progress without irrigation, and a glance at the plot would convince one regarding the irregularity of growth in height of the Ceara rubber plant in general. The plants here vary from 2 feet to 8 feet in height and some of the best are equal in girth to 3-year old plants in plot No. 11. The majority of our plants have been transplanted into the plot and we find that the check caused by this method retards growth in the plants for a considerable time. We find that by sowing filed seeds *in situ* no retardation of growth occurs in the first year and the plants are not so susceptible to drought. This is an important factor in the cultivation of Ceara in the Deccan, because in black soil it is exceedingly intolerant of long-continued moisture. During spells of cold nights the leading shoots often die; on recovering, the plants throw out forked branches, thus marring their symmetry. In order to arrive quickly at some definite conclusion regarding the advisability or otherwise of extending the cultivation of Ceara in the Deccan and Karnátak we have distributed seeds to Agricultural Teachers in all Training Colleges and also to Head Masters of High

Schools and to a few others interested in agricultural experiments who have promised to furnish periodical reports on the results attained by them.

7. *Cryptostegia grandiflora.*—A sample of this rubber was forwarded to the Imperial Institute in order that its quality and commercial value should be ascertained. The report received runs as follows:—

"The sample weighed about 13 ounces and consisted of a large porous lump of rubber which had been formed apparently by the aggregation of thin sheets and scrap. It was dark coloured, slightly sticky, and contained a considerable quanitity of vegetable and mineral impurities. The rubber exhibited very fair elasticity and tenacity.

Results of examination.

"The rubber was examined in the Scientific and Technical Department of the Imperial Institute and found to have the following percentage composition:—

Moisture	3·6
Caoutchouc (true rubber)	64·3
Resin	10·1
Albuminoid matter	7·9
Insoluble matter (including ash) ...	14·1
Ash	8·22

"The percentages of resin and albuminoid matter are both a little high, but the chief defect of the rubber is the presence of the large amount of insoluble matter consisting of vegetable and mineral impurities. The presence of mineral impurity points to the contamination of the rubber, possibly the scrap rubber present in the sample, by contact with the soil, and precautions should be taken to avoid this in future. The percentage of caoutchouc is rather low, but this is chiefly due to the excessive amount of the impurities contained in the present sample.

"Two specimens of the rubber of *Cryptostegia grandiflora* from India were examined at the Imperial Institute in 1903. A specimen forwarded by the Secretary of the Agri-Horticultural Society, Teynampett, Madras, was analysed and the dry material was found to contain 7·9 per cent. of resin and 2·6 per cent. of insoluble impurity. A second sample from Jalaun, which was rather inferior in physical characters, contained 9 0 per cent. of resin and 6·5 per cent. of insoluble impurity. Both these specimens therefore contained less resin and insoluble impurity than the present sample from Bombay. The amount of resin in the rubber varies with the age of the plants, a large percentage being present in the product from young vines.

Commercial valuation.

"A sample of the rubber was submitted for valuation to brokers who reported that it was rather sticky and slightly heated and would be worth 3*s.* 6*d.* per pound in London at the present time. For comparison with this

valuation it may be stated that the current value of fine hard Para from South America (the market standard for price) was 5*s.* 4*d.* per pound.

Conclusions and recommendations.

"The investigation has shown that this sample of the rubber of *Cryptostegia grandiflora* from Bombay is of very fair quality, and there is little doubt that the carefully prepared product would sell readily in the market at remunerative prices. The elimination of the vegetable and mineral impurities would considerably improve the quality of the rubber.

"In view of the statement that large supplies of this rubber are available it is suggested that a trial consignment of one or two hundredweights should be prepared and forwarded to the Imperial Institute for sale in London so that its commercial value can be definitely ascertained."

8. *Castilloa elastica.*—After another year's experience and observation this plant has proved to be absolutely unsuitable for the Deccan and, in company with *Hevea braziliensis*, it is simply grown under shelter as a natural curiosity.

9. The plants of *Funtumia elastica* referred to in last year's report under the synonym of *Kickxia africana* are in perfect health. Their growth is now remarkably slow and this is said to be a characteristic of the plant. Conflicting reports are published on the value of the rubber produced by this plant, but the general concensus of opinion in India seems to be that the plant is not worth growing.

10. *Ficus elastica.*—We have one young specimen, and the following interesting information was received from the Reporter on Economic Products to the Government of India, on a sample of rubber produced by the parent of this plant in the Empress Gardens, which is approximately 20 years old. It is gratifying to hear that this Assam rubber plant, which would thrive admirably in the Konkan near rivers, produces a rubber more valuable than that collected in its native country.

"Here are some figures of the proportion of resin to caoutchouc in the latex of *Ficus elastica* grown in Java:—

				Resin.	Caoutchouc.
Soebang,	35 years old	...	...	4·9	95·1
Buitenzorg,	15 ,,	...	...	8·3	91·7
,,	19 ,,	...	...	6·1	93·9
Tjiandjoer,	9 ,,	...	...	8·9	91·1
Tjipetir,	9 ,,	...	...	9·3	90·7
Blitar,	6 ,,	...	...	20·9	79·1
,,	12 ,,	...	...	13·1	86·9

			Resin.	Caoutchouc.
Lingasana,	7 (?)	years old	5·9	94·1
„	12 (?)	„	5·3	94·7
Moga,	8	„	13·1	86·9
„	12	„	11·5	88·5
Simpar,	9	„	17·0	83·0
„	12	„	13·0	87·0
„	13	„	12·4	87·6

"These places are arranged in increasing altitude above sea level: the author showing by them that altitude increases the resin, but you see from them how age decreases it.

"I am trying to get materials for working this out in India.

"Your rubber contains much less resin than the trees of the Government plantation of Assam."

11. The following rubber samples were collected and are exhibited in the Garden Museum :—

Manihot Glaziovii (Ceara rubber).
Hevea braziliensis (Para rubber).
Castilloa elastica (Central American rubber).
Cryptostegia grandiflora.
Ficus elastica (India rubber).

Fibre Experiments.

12. *Jute.*—This was tried on two plots—the first situated on high ground and heavily manured with poudrette and the other on low unmanured ground inundated twice during the continuance of the crop. The seed was received from the Director of Agriculture, Bengal, and the cultivation and extraction of the fibre was conducted under the advice of a Mahomeden jute expert cultivator from Bengal. The results of the trial are given in the table below. Early sowing was considered an important factor in the cultivation of the crop and the current year's experiments are arranged accordingly. No final opinion can of course be arrived at through one year's experience but the trial seemed worthy of repetition. A preliminary note on the cultivation of jute was drawn up from instructions given and carried by the expert and embodying the experience of its cultivation at the Poona, Mánjri, Bassein and Lanowli Stations and subsequently corrected by Mr. Finlow, Jute Expert to the Government of Eastern Bengal and Assam, and is placed on record for future guidance. It is given below :—

Note on the cultivation of Jute in the Deccan.

Soil and situation.—The medium black soil of the Deccan on moderately high ground is excellent; that at the Ganeshkhind Botanical Gardnes is

typical. The alluvial (red) soil formed of the debris washed from the western hill ranges is also suitable. Sandy soils of Bassein and its vicinity are also good, provided they are on high level ground. Small stones lying about on the surface will not be harmful and even stones of the size of an ordinary lemon will not matter at all. In all cases level ground so situated as to ensure good drainage should always be selected. [Climatic influences have also to be taken into account.—R. S. F.]

Preparation and manuring.—The land should be well ploughed and cross-ploughed in Fálgun (February-March) and the weeds, rubbish, *kunda*, etc., collected and destroyed. It should be left open to atmospheric influences for about 20 to 30 days and in Chaitra (March-April) it should be dressed with manure. Any ordinary manure such as stable refuse, farm-yard manure, will do. Poudrette is very good. Costly manures such as oil-cakes are not needed. It should be broad-casted into the furrows made by the ploughings. The field should then be levelled and covered over by means of a light *maind* or *samár*. The quantity of manure required for any soil would depend upon its suitability for jute. Best soils require one cart-load per *bigha* (25,312 square feet, a little more than half an acre). About 6 cart-loads per acre are absolutely necessary for inferior soils. [I think many soils would require more manure than this. Five tons per acre of farm-yard manure is common.—R. S. F.] A large quantity is said to kill the young jute seedlings by its "souring" effect. [This may hold as regards the Deccan. It is not quite correct with reference to Bengal.—R. S. F.] It is absolutely necessary to manure every land, however superior it may happen to be, for no jute will prosper even in the best lands without a dressing of manure. As a rotation crop to sugar-cane fields it will answer well, provided it be manured.

Sowing.—In the month of Vaishákh (April-May) the land should be irrigated thoroughly. In about 4 or 5 days thereafter, the land will have become sufficiently dry to allow of the working the harrow or a light *dantal* with which furrows should be made length-ways and cross-ways. The surface soil at this time should be such that, if crushed between the fingers, it should not stick to them. The furrows made by the implements in use here (*pábhar*, etc.) are at a distance of 9 inches. The Bengal implement used for this purpose makes small furrows at a distance of about 2 inches. In the absence of similar implements the necessity of cross-furrows with such as are locally available is evident in order to secure an even distribution of seeds. The seed is broad-casted in these furrows and then covered over by running the *kulav* or a light leveller. The seed rate is 2½ seers per acre. [6-9 lbs. per acre is the normal rate. Early sowing is a powerful factor in determining the success of a crop. Experimental crops in Behár sown in July have not been a success but those sown in March and even as late as May have. Obviously the time of sowing depends on rainfall or irrigation.—R. S. F.]

Weeding and thinning.—The seed will germinate in 3 or 4 days. In about a month the seedlings will grow 10-14 inches high. The field should now be weeded and seedlings thinned out. Only the overcrowded plants should be removed, leaving a space of about 1-1½ inches round each plant. Blanks may now be filled by transplanting from the thicker and crowded portion. At this time the land may be irrigated if deemed necessary. Generally plants, 9 inches high and above, do not require much watering as

they are then capable of obtaining it by their roots. Another thinning when about 3 feet high is needed, and with it weeding should also be done. This time the plants should be thinned 3 inches clear, which provides space to grow to a girth of 4 inches or more. If at this time the soil is cracked, or seems to want watering, the field may be irrigated. By Ashádh (June-July) they will be upto 13-15 feet. [I think weeding and thinning operations are of great importance. I think the distance between any two plants should not be less than 3-4 inches and the final thinning should be done when the plants are less than 3 feet high. Rather less than 1 foot would be better. I believe that early thinning is a considerable advantage.—R. S. F.]

Flooding.—Jute seedlings will not stand flooding when young and will certainly die if covered by water. When they grow up to about 5 feet high no harm will be caused by floods which usually soon abate. If the land selected is likely to be flooded, sowing should be put off till the chance of inundation is over. [If the plant has reached 5 feet before the flood it will probably not come to harm if it is inundated even though the water remains some time. The fibre becomes coarse in the latter case.—R. S. F.]

Flowering.—The jute flowers in Shrávan (July-August). It flowers simultaneously at this time in all localities. If the sowings are late the plants will still flower in Shrávan. Hence it is advisable to obtain the best possible development of bark tissue before the flowering season by sowing in good time.

Cutting.—The plants are ready to cut for fibre when just about to flower. [The Burdwán results indicate that a better yield of excellent fibre is obtained by cutting the plant when the fruits are just set. This also may be tried.—R. S. F.] They should be cut close to the ground by means of a sickle which has small teeth in the bend. The plants should on no account be pulled out; thereby the outer skin of the root interferes with the bark at the time of the latter's removal. The sticks should now be tied into small sheaves or bundles, which should be immediately put in standing water. In no case should the bundles be left to dry or neglected before putting in water.

Retting.—After about one week a trial test should be made to ascertain whether the bark is ready for removal. For this one stick should be taken out and held between the thumb and the next two fingers and tightly drawn between them from top to bottom; this removes all the cellular matter which may have undergone complete putrefication. The thick or lower end of the stalk should now be held in the left hand and attempt should be made to loosen the bark at the tip; if it has become sufficiently retted, it will come off very easily. This should now be stripped off by a small jerk or pull. It should now be stirred or waved in water, by which the undesirable constituents are washed away, leaving the fibre alone. If the bark is found soft and the fibre easily washed clear and is white and shining, then the whole lot may be considered ready to undergo the same treatment. If not, they should be left another day or two and again tested as before. Every day tests should be taken till it seems ready. Usually the bundles are ready for manipulation in from 8 to 14 days. Oversteeping weakens the fibre, which crumbles to pieces, and understeeping causes it to become hard and dark; so the utmost attention should be maintained on the retting process and every day tests should be made. [In

many cases the sticks are allowed to lie in such a way on the ground after cutting that while the leafy tops are exposed most of the stem is hidden. In this way the leaves are and can be shaken off; the upper branched portion of the stem is then cut away and the plant is immersed. They remain thus until the retting process has commenced in the lower portion after which the plants are completely immersed. In this way there is even retting throughout the plant; if the practice is not carried out the softer upper portion of the plant is often overretted by the time the lower portion is finished.—R. S. F.]

Extracting fibre.—All the fibre is extracted and washed in the manner described for the test sticks. The bark on separating from the wood should never be beaten with a wooden mallet, as is done for the *ambádi* (*Hibiscus cannabinus*) fibre. That spoils the jute fibre. It should only be stirred and washed in water to extricate all the intervening cellular matter.

Drying.—The wet fibre should be hung on horizontal lengths of bamboos in the open air for drying. The knots of these bamboos must have been made smooth. The fibre should not be hung on a string. The bamboo admits of spreading of the fibres at the points of suspensions, which facilitates thorough drying, while on the string the fibres are apt to collect into groups which retard drying and blacken the fibre.

Crop on rainfall alone.—Jute can also be grown successfully without irrigation, provided the ante-monsoon rains in the earlier part of May soak the soil well after it has been made ready, manured, etc., in the manner described above. Soon after the seeds should be sown. Subsequent rains in a normal season do generally fall at the proper times and the crop becomes a success. Indeed, it was grown this year in the Ganeshkhind Gardens without irrigation and the showers came on when it was just arranged to irrigate the field, the plants being then about 4 feet high.

Varieties of jute.—The following are varieties of jute:—

Dhavla Sunder	...	The stalks of this are white.
Kajali	...	The stalks are red.
Hatia	...	Stalks are brownish green.
Bidda Sunder	...	Stalks and leaves are red.

The white-stalked variety is considered to yield the best fibre. [Opinions differ widely about this in different districts.—R. S. F.]

The peculiarity of the jute plant seems to be that its full flowering period commences in August irrespective of the date of sowing so that to insure a chance of a crop of full height, sowing must be accomplished by the middle of April at the latest. This implies the necessity of irrigation until the setting in of the south-west monsoon. In spite of a considerable fall of rain in the present season three supplies of irrigation water were also necessary. *Corchorus capsularis*, which is probably the true jute plant, grows normally. But *Corchorus olitorius* which is a common wild plant in the Deccan reverts to its unsatisfactory branched and stunted habit. In procuring the seed for future experiments

from Bengal it should be distinctly specified that the seeds of *C. capsularis* only are required.

Other fibres tried in comparison are denoted below :—

Plant.	Area of experiment.	Weight of stalks.	Weight of dry fibre.	Percentage of dry fibre to stalks.	Outturn of fibre per acre.	Value per acre.	Remarks.
	Gunthas.	Lbs.	Lbs.	Lbs.	Lbs.		
Jute (*Corchorus capsularis*)—							
Upper plot ...	3·3	1,427	35	2·45	609	Rs. 76 @ Rs. 10-4-0 per Bengal maund.	
Lower plot ...	5·5	1,029	31	3·1	248	Rs. 20 @ Rs. 8 per maund.	
Sesbania aculeata ..	...	327	7	2	...	.....	Stray plants collected. Messrs. Ralli Brothers say that it lacks strength and is unsuitable for spinning and rope-making.
Hibiscus (Sp.)	...	64	4	6·2	...	.....	Stalks which had seeded were taken.

13. *Ramie fibre.*—Further experiments with this confirm the conclusion that the soil of the Deccan is unsuitable for this plant which requires more evenly distributed rainfall and lighter soil than we have in the west. The soil is probably most in fault because plants grown in pots in prepared compost thrive fairly well. Careful irrigation of the plants in the open is useless.

14. *Sisal Hemp.*—In the ordinary course this plantation in Plot No. 16 ought to have commenced to pole last year. Few of the plants show signs even of ordinary vigour, the leaves of most are curled and dry at the tips. This condition is probably due to the rank growth of grass around them. All our experiments go to prove that this fibre plant requires as good cultivation as any other crop if it has to yield a profit. Plants growing under the shelter of *bábul* trees are distinctly superior.

15. *Agave.*—Last year half-acre plots of the following were put out with the idea of ultimately arriving at the approximate outturn of fibre by area :—

Agave Wightii.
Agave Cantala.
Agave Vera-cruz.
Agave Sisalana.
Furcræa gigantea.

16. *Malachra capitata.*—This plant, which grows so well round Bombay during the rains, has after two years' trial been found unsuitable for cultivation in the Deccan owing to its low and branching habit induced by the lighter rainfall.

17. The following local fibres are now exhibited in the museum:—

Agave Cantala.
Agave Sisalana.
Agave Vera-cruz.
Yucca gloriosa.
Malachra capitata.
Hibiscus panduriformis.
Corchorus capsularis (jute).
Agave Wightii.
Furcræa gigantea.
Sanseveira zeylanica.
Musa textilis (Manilla hemp).
Hibiscus sp.
Sesbania ægyptiaca.

18. *Cotton.*—Special investigations in the botany of the cotton have been continued. A set of seeds to be grown for identification were received from the Inspector-General of Agriculture in India, and a long series of seeds of botanical and commercial varieties of cottons cultivated in America were received for trial and identification from Mr. F. J. Tyler of the Bureau of Plant Industry, United States Department of Agriculture. Owing to the satisfactory rainfall during the year under report the whole of the cotton sample plots were not irrigated. A commencement was made this year in the estimation of the average yield per plant of every variety grown, and the first results obtained in this line of enquiry are detailed in the following table:—

Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.	Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.
			Tolas.					Tolas.	
61	Bagar Siah	16	0·75	30·0	74	Lálio	17	1·07	26·6
62	„ Safed	10	1·8	33·3	75	Kánvi	22	1·8	30·7
63	„ Siah	11	1·3	33·3	76	Jowár Hatti	16	1·4	33·3
64	„ Safed	11	2·3	33·3	78	Mungári...	26	0·8	33·3
65	„ Siah	10	0·3	33·3	79	Northerns	21	2·8	33·3
66	„ Safed	11	2·4	33·3	80	Prodatur	27	0·5	33·3
67	Deshi, Multán...	17	1·3	33·3	93	Haldia	15	0·5	33·3
68	Bagar Siah	19	0·7	33·3	94	Bani	12	1·5	33·3
69	„ Safed	9	0·8	33·3	95	Dhárwár, Nimár	11	1·3	33·3
70	Lálio	15	5·3	31·2	96	Tiffania	12	0·8	25·0
72	Broach	18	1·8	38·1	97	Gangri	14	1·6	33·3

Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.	Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.
			Tolas.					Tolas.	
98	Cawnpur indigenous	14	1·07	33·3	128	Deshi, Lahore	17	0·5	25·0
99	Chanda, Cold Weather ...	8	2·3	33·3	129	Hissar	15	1·1	28·5
100	Yerapatti	15	0·1	33·3	130	Deshi Lyallpur	19	1·7	33·3
101	Narma	9	2·08	33·3	131	Dhárwár Dewas	13	2·5	33·3
102	Deshi, Dehra Gázikhán ...	12	0·9	33·3	132	Deshi Jhánsi	2	1·2	25·0
103	,, Ludhiana	9	1·6	33·3	133	Kápshi ,, ...	13	2·2	33·3
104	,, Ráwalpindi	13	1·4	33·3	134	Barrueca	23	2·2	33·3
105	Sutra, Multan	23	1·1	33·3	136	Deshi, Sadadabad	5	1·5	33·3
106	Majha ,, ...	13	0·8	33·3	137	Kadir	3	0·6	25·0
107	Deshi, Lahore	12	0·9	33·3	138	Deshi, Umbdlia	23	0·4	33·3
108	,, Hissar	10	0·7	33·3	139	Abaspur	5	0·5	25·0
109	,, Lyallpur	14	1·07	33·3	140	Deshi, Aligarh	15	0·1	33·3
110	,, Malvi	19	0·7	33·3	141	Jálna	13	0·3	33·3
111	Wona	10	1·0	25·0	142	Deshi, Meerut	6	0·6	33·3
112	Deshi, Málvi	7	1·4	25·0	143	Wan	7	1·08	33·3
113	Bana	17	0·4	33·0	144	Marwari No. 3	2	1·2	25·0
114	Bani	11	0·7	28·5	145	Deshi Málvi No. 1	22	0·4	25·0
115	Nimári	21	0·7	23·2	146	,, ,, No. 2	6	1·3	33·3
116	Bájgar	9	0·9	33·4	147	,, Mohilabad	9	1·1	33·3
117	Safed Kapás	12	1·5	33·3	148	,, Bunurally	6	1·2	33·3
118	Málvi or Bani	15	1·02	33·3	150	,, Kulpahar	6	1·6	37·5
119	Bani	11	0·5	30·0	151	,, Modha...	7	0·6	25·0
120	Thigalia	15	0·6	31·2	152	,, Paharpur	12	1·04	30·0
121	Deshi	6	1·6	25·0	153	,, Islámnagar	11	0·9	25·0
121a	Deshi cotton	23	0·3	23·5	154	,, Bhádarpur	12	1·04	40·0
121b	Lasing Angungba	14	0·3	33·3	155	,, Muradabad	18	2·8	36·5
121c	Khilgivi cotton	13	0·3	33·3	156	Tiffania	14	3·0	30·0
121d	Mirpurkhás	12	0·2	25·0	157	Deshi, Bareilly...	12	1·5	33·3
121e	Nujingyan	14	0·5	33·3	159	,, Babaoma	4	0·9	33·3
121f	Bárui	6	0·6	33·3	160	,, Radhia	12	1·2	33·3
121g	Deshi	17	0·3	33·3	161	,, Unao	6	1·2	33·3
122	Tiffania	13	0·3	33·3	161a	Bhogi Kapah	15	1·0	33·3
123	Mr. Mollison's Bani	12	1·6	37·5	162	Pánipat	1	2·5	25·0
124	Narma	4	1·2	25·0	163	Kapah	3	0·9	33·3
125	Deshi, Dehra Gázikhán ...	3	2·3	33·3	164	Deshi Ferozpur	10	1·3	33·3
126	,, Ludhiána	20	1·6	33·3	166	,, Jalandar	16	1·1	33·3
127	,, Majha	16	2·7	34·2	167	Kathiapak	20	1·5	33·3

Serial number o the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.
			Tolas.	
168	Deshi, Sialkot	17	0·8	33 3
169	Worr-kapah	10	3 3	33·3
170	Sindhi Cotton No. 1	13	2·4	33·3
171	„ „ No. 2 ...	17	0·2	33·3
172	„ „ Kapro ...	12	1·2	33 3
173	„ „ Pithro ...	11	1·7	33·3
174	„ „ Upper Sind Frontier.	12	2·5	33 3
175	Márwári No. 1	13	2 3	33·3
176	„ No. 2	12	2·1	33·3
177	Deshi United Provinces ...	9	2·9	33·3
178	„ Allahabad	5	1 0	25·0
180	„ Rahalpur	11	1·02	33·3
181	„ Cawnpore	16	1·4	33·3
182	„ called Kapás	10	2 2	33·3
183	„ Shirájpur	8	2·3	33·3
184	Lálfikra	15	2·0	33·3
186	Hirwani	10	1·8	33·3
187	Mathio	24	1·4	33 3
188	Berkley, Ralli Brothers ...	22	1·2	33·3
188a	Deshi, Umbálla	23	2·4	33·3
189	Khumra	29	1·2	33·3
191	Bhurila	18	1·04	33·3
192	Banwála...	22	2·7	33·3
193	Braisa soft lint	16	1·4	33·3
194	„ coarse lint	20	0·5	31·2
195	Haldia	26	1·2	33·3
196	Wotha	10	1·1	33·3
197	Nágpur Yellow	23	2·3	44·4
198	Chinto white	21	0·7	34·5
200	Khong	15	2·0	33·3
201	Deshi Saim	9	1·1	29·4
201a	Kapas, Jowai	22	1·3	33·3
201b	Chimpti Kháki	3	10·0	33 3
201c	Kulthang	14	2·4	33·3
202	Lasingangaba	7	2·1	33·3
204	Bung	20	3·2	30·7
205	Wapya	15	1·7	33·3

Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.
			Tolas.	
208	Wapya	9	6 3	34·7
209	Wa-gale	14	3·7	38·09
210	Mandalay	26	2·1	31·7
211	Shan	23	0·9	33·3
212	White cotton, Langan ...	17	2·9	35·0
213	„ Mynima ...	16	2·3	33·3
214	Wa-gale, Notogyir	20	2·4	33·3
215	Burma cotton	11	1·5	28·5
216	„ Mandalay ...	18	1·8	33·3
217	Wa-pya	10	2·2	33·3
219	Wa-pya	22	1·1	33·3
220	Wa-bya	12	2·6	33·3
221	Wani	13	5·1	33·3
222	Wa-bya	19	1·3	33·3
223	„ Myingyan	25	1·5	33·3
225	Kokati	9	1·6	33·3
227	Lasinganganba	23	2·7	28·0
228	Kháki, Shewbo	13	2·8	33·3
229	Pini	24	2·8	33·3
230	Kháki, Langan...	13	2·5	33·3
231	„ Pank Division ...	23	2·4	33·3
232	„ Mynima	15	2·7	33·3
233	Wani, Allanmyo	19	1·3	33·3
234	„ Moniva	19	1·9	33·3
235	„ Budalin	10	1·8	33·3
236	„ Zimbavim	9	1·6	33·3
237	„ Mynigyan	1	5 0	25·0
238	Káti	9	2·08	33·3
239	Deshi, Umbálla	21	1·9	33 3
240	Narma	13	0·9	30·0
241	Abaspur...	15	1·0	33·3
242	Deshi Aligarh	14	1·07	33·3
243	Jálna	17	1·5	33·3
244	Achena...	15	0·6	25·0
245	Meerut, Deshi	19	2·7	33·3
246	Waradi	21	1·9	33·3
247	Jari	23	1·6	33·3

Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant	Percentage of cotton to seed.	Serial number of the variety.	Name.	Number of plants dealt with.	Average yield of seed cotton per plant.	Percentage of cotton to seed.
			Tolas.					Tolas.	
248	Kupra	20	1·8	33·3	283	Assam No. 3	21	1·7	33·3
249	Deshi	18	1·6	33 3	284	Kar	27	2·9	34·7
250	Sindhi cotton	18	1·3	33·3	285	Chapti Kapah	10	1·5	33·3
251	Bednore	15	1·2	33·3	286	Deshi Jutri	16	1·4	33·3
252	Deshi Muttra	19	1·5	33·3	287	Assam No. 22	21	·07	39·3
253	„ Allahabad	13	2·01	33 3	288	Comilla Khâki...	15	1·0	33·3
254	„ Garsikran	20	1·3	33·3	289	„ „ Sind	25	1·1	30·5
255	„ Aligarh...	18	0·8	33·3	290	Dhowna	16	1·6	33·3
256	Tiphakia...	10	1·1	33·3	291	Kâthi	15	1·5	33·3
258	Chompâkia	9	1·6	33·3	292	Assam No. 21.	22	1·3	33·3
259	Deshi, Bakim	27	1·6	33·3	293	Foreign No. 4	17	1·3	33·3
260	Kulpahar	18	2·03	33·3	293*b*	Kheltan	24	1·2	33·3
261	Deshi, Bhelo	17	1·7	33·3	293*c*	Chimti	15	3 0	33·3
261*a*	Mr. Mollison's Jari type ...	24	1·4	33·3	293*d*	Kil	19	2·3	33·3
261*b*	Bársi	9	1·6	33·3	293*e*	Mirpurkhás	13	2·4	33·3
262	Hirawani	21	1·2	33·3	293*f*	Burma cotton	11	1·2	33·3
263	Mathio	19	1·1	33·3	294	Dhárwár-American	27	1·6	33 3
264	Motho Mathio	23	1·1	33·3	295	Upland	26	2·5	30·4
265	White cotton	20	1·1	33·3	299	Jethia	25	2·4	33·3
267	Deshi, Hardoe	28	0·8	33·3	304	Manchan	16	2·5	31·2
268	Khonko	27	0·9	33·3	307*a*	Bársi,-American	18	1·1	35·5
269	„ Akao	22	1·2	33·3	308	Khâki, Lyallpur	14	2·5	28·5
270	Soru Kapah	24	1·4	33·3	309	„ Sujabad	21	1·5	26·3
271	Bar Kapah	14	1 6	33 3	310	Hujardasta	20	3·4	29·7
272	Khunsa	24	1·4	33·3	312	Jogya	17	2·2	30·0
273	Bhung	14	1·8	33 3	313	Narma	17	3·2	27·2
274	Kil	17	1·3	33 3	314	Pili Kapás	16	1·8	37·5
275	Nagpur white	11	2·04	33·3	315	Manwa Khâki	22	2·3	28·5
276	„ creamy white ...	12	2·8	33·3	316	Brown cotton	32	1·9	32·0
277	Comilla	6	2 7	33·3	317	Viláyti, Jhánsi	21	3·3	35·7
278	„ Sind	10	3·0	33·3	318	Bani Peela	9	4·1	33·3
279	Chapti Kapah	13	3·1	33·3	319	Narma Khâki	18	5·5	30·0
280	Dhawria	14	3·6	36·5	320	Viláyti brown	19	2·5	33·3
281	Khilgiri	9	3·3	33·3	321	„ white	19	2·1	34·3
282	Kil	12	0·7	25 0					

19. The results of the special varieties of cotton that are being experimented with are given below.

Bourbon.—American Cotton No. 2.—A small plot was planted in July 1905, the plants standing 8 feet apart. The plot is not irrigated but is sheltered from prevailing winds by a belt of trees. During the first year the plants did not boll. In 1906 they started bolling in October and continued till the end of May.

Kidney cotton.—American Cotton No. 4.—This was planted at the same time as and in a plot adjoining that of Bourbon. A number suffered from lack of sufficient humidity in the atmosphere in the cold weather. Some, which were sheltered towards the west, survived and flowered in 1906, but the number of bolls was low. We are disposed to believe that this variety is not promising and its requirements of perfect shelter is difficult to satisfy in a treeless country like the Deccan.

Soft Peruvian.—American Cotton No. 1.—This was also planted in July 1906. During the first season the plants made fairly rapid vegetative growth and some of them were distinctly inclined to form bolls also. In 1906 they flowered and bolled quite satisfactorily. This tree cotton answers to the definition of a tree more nearly than any of the four species we have at present. Some stems attain a girth of 14 inches in one year.

Dhárwár-American.—This was tried as an inter-crop between the lines of oranges in order to suppress the weeds as far as possible. Two separate lines of this cotton planted in July 1905 were retained to see whether they would yield well for another season. These yielded very meagrely the first year, but the results in the second season showed a great improvement in yield.

Peruvian cotton.—American Cotton No. 3.—Plants put out in 1905 have not yet flowered. They are grown without irrigation.

Dhárwár-American and Ghogári cotton.—One quarter acre was sown along with other annuals to ascertain the yield by area.

Spence cotton.—These were planted in February 1907 and are under observation. In the Deccan soil these are not distinguishable from Bourbon.

From the following valuation received from Messrs. Tata & Sons, Bombay, it is very satisfactory to learn that Bourbon and soft Peruvian, which we consider the varieties of American tree cottons most suitable for introduction into the Deccan, have been reported on so favourably. The valuation is based on the quotations ruling on 20th May 1907.

"*Bourbon cotton.*—The sample shows too many yellow stains and is very seedy. The class of the cotton is not satisfactory, but the staple is long and silky and the fibre shows much strength. We value it at Rs. 270 per *khandy* (784 lbs.).

"*Dhárwár and Ghogári cotton.*—It is seedy, dirty and stained, and we can place it in the lowest class, *viz.*, 'good' (fine, fully good and good). The staple is mixed and irregular. Price Rs. 165 per *khandy*.

"*Gossypium neglectum, No. 185C.*—It is stained and can be classed as 'fully good.' The feel is soft and silky and the staple is good. Price Rs. 240 per *khandy*.

"*Dhárwár-American.*—Stained and seedy and can be classed as 'good fair' (good, fully good fair, good fair and fair). The cotton is silky and of good staple. We value it at Rs. 250 per *khandy*.

"We may add that the seeds are removable by proper ginning and the stains by judicious picking. By removing these two defects you will enhance the value of the cotton about 5 per cent.

"*Bourbon cotton* (Bassein sample).—The sample is Kapás (cotton with seed) and not pure cotton. If properly ginned so as to remove all stains, seeds and unripe fibres, the cotton may fetch about Rs. 290 per *khandy* of 784 lbs. The fibre is very strong, colour creamy white and feel soft and silky. The cotton is good for spinning 40s.

"*Soft Peruvian.*—Very long-stapled, white, nice cotton, but fibre very weak. Good for spinning higher counts in combination with other varieties having strong fibre, of which it would be advisable to make a mixing. Feel rather harsh, value today (5th July 1907) about 8*d.* per pound."

Below are tabulated the results of these special varieties of cottons :—

Name of variety.	Area of experiment.	Number of plants experimented.	Total yield of seed cotton.	Yield of seed cotton per plant.	Per acre.		Percentage of lint to seed.	Market valuation from Messrs. Tata & Sons.	Remarks as to market value, etc.
					Lint.	Seed.			
	A. g.		lbs.	ozs.	lbs.	lbs.		Rs. per khandy of 784 lbs.	
Bourbon cotton	0 5·6	96	34·5	5·75	77·8	166·2	31·8	270	Market quotation for Broach fine of the same date was Rs. 274. A Bassein sample from the same seed was valued at Rs. 290.
Soft Peruvian	0 2·5	44	27	9·6	154·2	262·3	37	392	The best Broach on this day was quoted at Rs. 272, Westerns Rs. 249, Dhárwar, Rs. 235.
Dhárwár-American + Ghogári.	0 10	...	162	...	184	464	28·2	165	
Dhárwár-American, first season's plants.	1 2·5	...	140	...	38	70	35·2	250	Saw ginned Dhárwár is quoted at Rs. 251.
Dhárwár-American, second season's plants.	...	78	34	6·9	...	...	33·3	...	Last year the same two lines yielded 3 lbs. of cotton.
Caravonica, No. II ...	...	1	...	21	...	...	38·4	...	
G. neglectum, 185c ...	0 1·93	...	32	...	248	414	37·5	240	This is classed as "fully good." Similarly classed Broach was quoted the same day at Rs. 269, Nágpur Rs. 222, Yeotmal Rs. 210, Dhámangaum Rs. 203, Bhávnagar Rs. 220, Westerns Rs. 248, Bágalkot Rs. 242.

Camphor (Cinnamomum Camphora).

20. The following table gives the measurements of girth and height of the plants :—

Situation of the plant.	Planted in	Height.		Girth.	Remarks.
		Ft.	in.	Inches.	
Planted in No. 10 ...	1903	3	2	1·5	Girth—one inch from ground.
Planted in No. 7 ...	1904	2	8	3·5	
Near office ...	1906	6	0	2·5	

The plant near the office is sheltered and partially shaded by a Duranta tree on the west but open on the remaining sides, and receives an almost regular supply of water from a waste channel. This plant is very bushy and seems full of vigour.

I have hopes that the camphor plant will thrive well, treated as a hedge under irrigation, and experiments are being undertaken with that view. As the plants we have can be propagated only by layers their numbers are increased very slowly.

Fruit Plantations.

21. *Mangoes.*—For many years the lack of produce from the great number of mango trees established in this Garden has been a disappointing feature. After a long series of observations, carried over some years, it was decided that the trees were held in perpetual check by excessive irrigation and the consequent rank growth of perennial pasture grasses. It is a well known fact that young mango trees should be irrigated at short intervals for two to three years after being planted; when they are thoroughly established the rainfall of the locality should suffice to carry them on throughout the year, with the exception perhaps of the flowering period when one good supply of irrigation water should be given to assist in the formation of the fruit. Grasses should be systematically cleared away from the plots. The large trees which have originated from seedlings in this garden cast sufficient shade to prevent the undue growth of grass, but grafted plants which

never attain large dimensions do not seem to be able to smother grass unless very closely planted, when an enormous reduction in the produce of fruit occurs. After a few years of careful treatment many plants which were once in a moribund condition are now strong, healthy trees producing good crops. Mango trees seldom bear well two years in succession. Last year the crop was very good, this year it was short, and next year we expect a good crop again. There are 5 varieties of mangoes grown on a pretty large scale, the majority being Páiri, the remainder are Alphonse, Cowasji Patel, Borsha, and a set of large country mangoes dating from the time of the Peishwas.

22. *Pomegranates.*—Seven varieties grown from seeds of specially selected fruits were put out in July 1905. All these are progressing satisfactorily, many of them already producing fruit. Some particularly strong individuals fruited in the first year. This is contrary to the general idea that pomegranates only fruit in four to five years after germination.

The following varieties are cultivated :—

Poona No. 1.—Fruit surface scarlet, red strips in the middle about 1½ inches broad; basal and apical portions paler, black dotted all over. Length 3½ inches; circumference 12 inches, 7-angled. Apex tubular truncate; base hollow; peduncle attached in the hollow. Pericarp tough. Seeds many, attached to a short funiculus, oblong, slightly tapering at base, 6-angled, deep scarlet at apex. Taste more astringent and less agreeable than Poona No. 3. Fruit dehiscing on one side only. Weight a little over one pound.

Poona No. 2.—Fruit 5-angled, split on one side near the apex. Weight little less than one pound. Apex as Poona No. 1. Surface dark red spot at one side of the base, pale red above the spot up to the apex, remaining portion brownish white, dark spotted on the dark and pale red portions. Length 3½ inches, circumference 11½ inches. Seeds oblong, 5-angled, conical, smaller and redder than Poona No. 1; less pulpy and astringent than Poona No. 1.

Poona No. 3.—Fruit weight equal to Poona No. 2. Surface green yellow with black spots all over. Colour one half deeper and the other half mixed scarlet. Tube of the calyx 6-lobed. Seeds equal in size and pulp to Poona No. 1, 5-cornered. Taste more agreeable than Poona Nos. 1 and 2. Pericarp thicker than Nos. 1 and 2.

Sangamner No. 1.—Fruit quite similar in all respects to Poona No. 3 except in weight which is a little less.

Sangamner No. 2.—Fruit 6-cornered, scarlet red all over, deeper towards the extremities. Taste rather inferior to Sangamner No. 1. Calyx tube not conspicuous.

Cabul.—Fruit 8-cornered. Integuments thicker than Muscat variety. Colour rather deep red mixed with a little pale yellowish white. Calyx lobes absent. Base of style distinct and protruding, having the shape of an inverted glass. Seeds have a darkish pulp on them and the taste rather bitter which might have been due to the fruit being slightly rotten. The fruit was hollow at the base, the hollows being surrounded by hard rim on the inner side. Weight one pound. Circumference 11 inches.

Muscat.—Fruit weight one pound. Length 3 inches. Circumference 10 inches at base and towards the apex 6 inches. Apex hollow. Calyx lobes deciduous. Base of style distinct. Surface upper part shining whitish with a red tinge and the lower reddish. Pericarp stiff and hard. Seeds 5-cornered. Pulp pale red. The fruit was 8-angled.

The Muscat and Cabul varieties seem plants of dwarfer habit and have not grown even half so much as the other indigenous kinds, but at the same time they must be considered as being in perfectly healthy condition.

23. *Custard apples* (*Anona squamosa*) are making comparatively slow progress, and the same remark applies to the Bullock's Heart (*Anona reticulala*) and Sour Sop (*Anona muricata*).

24. *Oranges and Lemons, etc.*—This area has become infested with *kunda* grass (*Ischæmum pilosum*). Attempts have been made to root it out periodically, and it will take long before the pest is completely suppressed. In spite of this difficulty, however, the Nágpur and Málta oranges are progressing very satisfactorily. Santra, Mosambi, Kavla, Sákhar Limbu, Citron, Mahálungi and other species of citrus have grown fairly well. Citron Turanja has fruited this year.

Orange de Société compared with other varieties seems to lack vigour. *Pear la Conte, Orange de calbre blood,* Lime Deshi Kalamba, Citron finger are not adapting themselves to the climate and conditions. Steps are being taken to replace the few blanks and to bring the weeds under control.

As *kunda* grass is killed out by shade Dhárwár-American cotton was grown between the lines of oranges for one year with the hope that this would keep the grass down. This year jute has been thickly grown with the same object after the land had been ploughed and hand weeded, and it is too early yet to state whether any benefit accrued. In the course of years the oranges, limes, etc., will probably kill this noxious weed with their own shade. *Kunda* grass and *lavála* (*Cyperus rotundus*) are the most intractable weeds in good black soil in the Deccan. No remedy except deep digging and hand picking proves effectual, and being drought-resisting even a long period of dry weather does no harm to them.

The following varieties are cultivated :—

Citron Turanj.
Citron finger.
Lime at Annui.
Lime at Annui kala.
Deshi Kalamba.
Lemon Florida.
Lime Galgal.
Lime Jamberi.
Lime Jamberi, brown.
Lime Kagzi.
Lime Khatta.
Lime Sylhet.
Lime Sweet chickna.
Lime Galgal.
Lemon Bijori.
Lemon Malta.
Lemon Italian No. 76.
Lemon Edratin de calabra.
Oranges Nágpur.
Pomeloes from Chimbore (Bombay).
Orange de calabra.
Orange de Société.
Orange de Malta.
Orange Sour Florida.
Peach, country, No. 1.
Do. No. 2.
Do. No. 3.
Do. No. 4.
Pear, China.
Pear la conte.

Garden Crops.

25. *Potatoes.*—Marseilles and Italian potatoes were tried on small plots in November and the yields calculated came to 2 tons and $\frac{7}{8}$ ton per acre respectively. As the areas experimented with were very small we do not consider these figures reliable and purpose repeating the trials on a larger scale next season.

26. *Yams.*—The following statement shows the varieties tested with results :—

Statement of yams grown in the Ganeshkhind Botanical Gardens in 1906-1907.

Serial number.	Registered number of Reporter on Economic Products.	Name.	Vernacular name.	Locality.	Date of planting.	Number of sets planted.	Outturn of tubers.	Remarks.
1	14113	D. alata	.....	Bengal	7th June 1906.	4	35 lbs. ...	Selected for growing in 1907.
2	.....	D. alata	.....	Sibpur Bengal		4	8 "	
4	13857	.....	Balabi Madhubam ...	Bengal		4	20 "	
5	14052	.....	Hati Danti	Do.		4	21 "	
6	.....	D. alata sp.	Puree bok L. Rata tural P.	Darjiling		4	8 "	
7	13815	.....	Kurkurálu	Barseti Bengal		4	2 "	
8	14046	D. alata	Mánálu	Pubna		4	11 "	
10	13952	D. alata	Khámálu	Jessore		4	7 "	
12	.....	D. Globosa	.....	Sibpur		4	3 "	
14	12076	D. Globosa	.....	.....		4	1 "	
15	.....	D. Globosa	Kháálu	Chittagong		4	1 oz.	
16	13914	D. Globosa	Do.	Alipur		4	½ "	
18	13816	D. Rubella	Goramalus	Baraset		4	½ lb.	
19	.....	D. Bulbifera	Bauti	Birbhum		4	2 ozs.	
25	9155	D. Bulbifera	Bauti kand	Alipur		4	*Nil.*	
29	15446	Do. (Karva) ...	Kawa	Jabbalpur		4	¼ lb.	
30	16208	Do. ...	Kárand	Bombay		4	1½ "	
33	15819	Do. ...	Bhihi kand	.....		4	1 "	
34	11481	Do. ...	Chanderi kand	.....		4	*Nil.*	
43	18118	D. alata	.....	Godávari, Madras ...		4	16 lbs.	
44	17966	Dioscorea	Pendalum	Krishna, Madras ...		4	18 "	
45	18111	Do.	Do.	Godávari, Madras ...		4	*Nil.*	
46	17955	Do.	Vetulaivalli Kelangu ...	Tanjore		4	23 lbs.	
47	18115	D. alata	Chenchangold	Karnul		4	10 "	
48	Corey No. 124 ...	D. Farcini formis ...	Parlukinoli	Ganjam		4	14 "	
49	17967	Do. ...	Pendalum	Cuddapah		4	4 "	
50	18113	D. alata ...	Do.	Salem, Madras		4	23 "	
51	18523	D. alata ...	Vethilai Vellai	Salem, Arcot		4	5 "	
52	18523	D. alata ...	Do.	Do.		4	4 "	
53	F. No. 14589 ...	Farciniformis ...	.....	Calentha		4	12 "	

Serial number.	Registered number of Reporter on Economic Products.	Name.	Vernacular name.	Locality.	Date of planting.	Number of sets planted.	Outturn of tubers.	Remarks.
54	18114	Farciniformis ...	Deva Pendalum ...	Ganjam	7th June 1906.	4	½ lb.	
55	18114	Do. ...	Do. ...	Do.		4	5 lbs.	
56	17953	Dioscorea ..	Keya Pendalum ...	Do.		4	3 ozs.	
57	Bourdilon No. 6.	D. alata Farciniformis ...	Kaphan Kudinal ...	Travancore		4	5 lbs.	
58	Do. No. 25.	D. alata Succiformis ...	.....	Do.		4	8 „	
59	Do. No. 12.	D. Rubella	Oolinal Kachal ...	Do.		4	4 „	
61	17619	Do.	Kaddi Kavali	Trichinapoly		4	1½ „	
62	17757	Dioscorea	.....	Madras		4	1½ „	
63	17612	D. alata Globosa ...	.....	Do.		4	8 ozs.	
64	17759	Dioscorea	.....	Do.		4	9 lbs.	
65	17756	Do.	.....	Do.		4	8 „	
66	17608	D. alata	Vethivallai Kilangu ...	Do.		4	4 „	
67	17761	Dioscorea	.....	Do.		4	8 „	
68	17611	D. alata	.....	Do.		4	15 „	
69	17758	D. fasciculata	.....	Do.		4	*Nil.*	
70	19509	D. alata farcini formis ...	Nivogna Myank	Tanugya, Burma ...		4	7 lbs.	
71	19521	Do. ...	Sincha Myauk	Sawk State, Burma ...		4	6 „	
72	19513	D. Rubella	Myankthi	Lanok do. ...		4	5 „	
73	19523	Do.	Sincha Myank	Do. ...		4	43 „ ..	One tuber weighed 21 lbs.
74	19524	Do.	H. P. A., H. P. and Myank.	Tanqui State, Burma ...		4	1½ „	
75	Gage ...	D. Succiformis	Myank Gyni	Minbu Burma		4	6 „	
76	Gage ...	D. Farciniformis ...	Myank Kyinegya ...	Do.		4	11 „	
77	Gage ...	Do. ...	Myanku	Do.		4	13 „	
80	19130	Do. ...	Gatal	Midnapur		4	2 „	
81	F. No. 17538 ...	D. Globosa ...	.....	W. India, Bombay ...		4	*Nil.* ...	Not germinated.
82	.....	Western India Yams ...	.....	Do. ...		4	3 lbs.	
83	.....	Karanda	Káranda	Thána		4	5 ozs.	
84	.....	Crop Yams	.. ...	.....		4	4 lbs.	
85	.....	Bottle neck Lisbon ...	.....	... ..		2	*Nil.* ...	Not germinated.
86	.....	Hunt Yams	.....	.....		2	Do. ...	Do.
87	20694	D. alata	.....	Fiji Island		2	8 lbs.	
90	20679	Do.	Uir Kelvo	Do.		2	*Nil.* ...	Not germinated.

91	20714	Do.	.....	Do.	7th June 1906.	4	3 ozs.	
92	20683	Do.	Wahadna	Do.		4	½ lb.	
97	21169	Do.	Myankanig	.....		4	*Nil.*	
98	21113	D. Fasciculata	Man	.....		4	*Nil.*	
100	20362	D. alata Globosa ...	Kavali Kilangu	.....		4	3 lbs.	
101	21171	Do. ...	Ghandiali	.....		4	2 „	
102	21080	Do. Digitata ...	Katu álu	.....		4	13 „	
104	22445	D. alata Globosa ...	Phan Mash	.....		4	10 „ ...	Selected for growing in 1907.
105	21610	D. alata	Benca álu	.....		4	3 „	
107	21708	D. alata	Angilior álu	.....		4	*Nil.*	
108	22304	Dioscorea	Raja álu	.....		4	8 lbs.	
109	21626	D. alata Glabra ...	Manting song	.....		4	6 „	
110	22897	D. alata Rubella ...	.....	.....		4	*Nil* ...	Not germinated.
111	22280	D. alata	Tuma Gensa	.....		4	17 lbs.	
112	.....	Dioscorea	.....	U. S. Lyons, Esq., Manilla.		4	16 „	
113	21691	D. alata	Belat Myank Wing Dang .	Do. ...		4	2½ „	
116	19514	Dioscorea	Myankgyi Mon	.....		4	*Nil* ...	Not germinated.
117	17954	Do.	Villilanalli Kilangu ...	.....		4	6 ozs.	
118	21165	D. Fasciculata	Thein or Et	.....		4	2 „	
119	21095	D. alata Kathar ...	Kathar Kanda	.....		4	2 lbs.	
120	20364	D. alata Rubella ...	Dukha Pendalum ...	.....		4	9 „ ...	Selected for growing in 1907.
121	22305	Dioscorea	Puraliala	.....		4	7 ozs.	
122	20480	D. Fasciculata	Sutni tani or Sidulok ...	.....		4	½ lb.	
124	22681	Dioscorea	Khambálu	.....		4	3 lbs.	
125	22628	D. Bulbifera	.....	.....		4	2½ „	
128	20461	D. Fasciculata	Harubi	.....		4	5 „	
129	.....	Dioscorea	.....	Mitchell, British Guina ...		4	4 „ ...	2,420 lbs. per acre.
130	20772	Do. alata	.....	Fiji Island, Indian Museum, Calcutta.		4	2 ozs. ...	302 lbs. per acre.
131	20710	Do.	.....	Fiji 14th December 1903 .		4	*Nil* ...	Not germinated.
132	20696	Do.	.....	Do. ...		4	4 ozs. ...	605 lbs. per acre.
133	20674	Do.	Tancela Dulunla	Fiji Island, Indian Museum, Calcutta, 14th December 1903.		4	...	378 lbs. per acre.
134	17618	Dioscorea	.....	Tanjore, Madras, Indian Museum, Calcutta.		4	7 lbs. ...	105 lbs. per acre.
135	20702	Do. alata	.....	Fiji Island, Indian Museum, Calcutta.		4	6 „ ...	3,630 lbs. per acre.

27. *Sugarcane.*—Mr. Meggitt, the Agricultural Chemist, has selected a small plot for growing sugarcane with the intention of personally selecting individual canes by chemical and other methods for propagation. The results will be reported on in due course. Very valuable results have been obtained by these methods in the West Indies and only experience will prove whether or not they are suitable for Indian conditions.

Grain Crops.

28. *Bhádli.*—An enquiry was instituted on the identity of this crop and seeds were obtained from the chief centres of cultivation in the Bombay Presidency. The seed was grown this year in the Ganeshkhind Botanical Gardens. It was sown about the middle of June 1906 and ripened too late to be included in last year's report.

Bhádli is distinguished from the other small millets by the long drooping rarely erect bristly heads. Some of the latter are often cylindrical and slightly tapering towards the apex. They are divisible into 4 types, roughly recognizable by the—

(1) short or absent bristles. Násik, Ahmednagar. *Setaria italica, var.* 1.

(2) long bristles and crowded branches of the panicle. Panch Mahál. *S. italica, var.* 2.

(3) purple colour of the head and much laxer branches of the panicle. Bársi and Poona Farm. *S. Italica, var.* 3.

(4) this is rather distinct from the others and is known by the more slender heads with yellowish bristles and the grains (spikelets) arranged in whorls directly on the slender axis. *Setaria glauca. Káng,* Poona Farm (Ratnágiri). *Navani,* Hangal (Dhárwár).

The cultivation of Bhádli does not seem to be of any importance. Its distribution in the Presidency is as shown below :—

	Acres.
Khándesh	4,104
Násik	3,985
Ahmednagar	4,087
Poona	4,728
Sholápur	404
Panch Mahál	117
Broach	165

Panicum pilosum of Dalzell and Gibson's Bombay Flora supplement, page 98, is probably No. 2.

Panicum (?) sp. of Dalz. and Gib.'s Bombay Flora supplement, page 98, is probably No. 1.

Panicum (?) sp. of Dalz. and Gib.'s Bombay Flora supplement, page 98, is probably No. 3.

29. *Wheat.*—Ten plots making up one acre in all were sown with wheat in order to test the soil capabilities and suitability for an elaborate manurial testing scheme, as also to test the uniformity of the soil in the different portions of the area selected. The crop was very poor and the inequalities between the different plots and between portions of the same plots showed the unsuitability of the soil for such experiments and consequently the scheme was abandoned.

The following report and valuations were received from Messrs. Ralli Brothers on a number of wheat crosses which have been evolved during the last few years :—

"We have examined the 113 samples of wheat you sent us and find them on the whole unsatisfactory. Barring about a dozen samples, amongst which there are some very good hard yellows and some fairly good soft whites, all the other samples do not come in the class of wheat exportable from Bombay and can only be sold for local consumption.

"Herewith our report on the various samples. What we would have wished to see is the improvement of standard Bombay qualities, *viz.*—

Soft white wheat as pure as possible.

Hard yellow wheat as pure as possible.

Hard red Dhárwár quality as pure as possible.

"The samples which in our opinion are really very good are Nos. 6, 25, 63, 65, 73, 103, 107, 112. We may further add that the examination of a good many of the samples was rendered rather difficult through their not having been freed from their chaff.

Sample No. 1. 11. 36. Khapli + Kálákusal, spikelets broad.
Hard red wheat, of no great value. Quality good.

" 2. (39*a*.) Rangrih + Australian 46, very small awns.
Glossy wheat, good with fairly easy sale.

" 3. Naiski (plot 2).

" 4. IV. Khapli + Pivla Násik.
Undesirable.

Sample No. 5. 31. Daudkháni + Australian 27. Soft wheat, fairly good, contains some immature and small grains.

" 6. Siah Das.
Very good superior hard yellow wheat.

" 7. 65. Chaval Kátha + Khapli.
Mixed hard red, quality undesirable.

" 8. 9. Khapli + Pánsángli.
Good hard red of the Khapli description. Very little of such quality is exportable and as a rule fetches a lower price than any other kind of wheat.

" 9. Dhayak.

" 10. VI. Pivla Násik + Khapli.
Fairly good hard red.

" 11. Surkh.

" 12. 70. Khapli + Chaval Kátha.
Quality undesirable.

" 13. VI. c. Pivla Násik + Khapli, Extra grains.

" 14. IX. Pivla Násik + Khapli.

" 15. XII. Pivla Násik + Kálákusal.

" 16. VIII. Pivla Násik + Khapli.
Hard yellow, not very good quality, being small in grain.

" 17. 11. 3 c. Khapli + Kálákusal, spikelets large.

" 18. 31. Daudkháni + Australian 27.
Undesirable.

" 19. Dhayak. 2nd sample of the same name.

" 20. Saiok.
A mixed quality of soft and glossy wheat, immature, small.

" 21. VI. A. Pivla Násik + Khapli. Short, congested.

" 22. XII. Pivla Násik + Kálákusal.
Inferior hard yellow.

" 23. 40. Kátha Nagpore + Khapli.
Mixed hard red and glossy, of a difficult sale.

" 24. LX. Pivla Násik + Khapli.

Sample No. 25. 1. Australian 28/32 + Australian 27, 3 grains.
Very good.

" 26. 61. Kátha Baroda + Khapli.

" 27. 62. Khapli + Kátha Baroda.
Fairly good hard red.

" 28. 111. Khapli + Pánsángli.

" 29. Surkh Kosha.
Undesirable.

" 30. 31. Khapli + Shet of Párner.

" 31. Pánsángli + Kálákusal.
Very good.

" 32. VII. Pivla Násik + Khapli.
Hard yellow, of fairly good quality, might be improved.

" 33. 61. Kátha Baroda + Khapli.
Undesirable.

" 34. 63. Pissikhaberia + Khapli.

" 35. 11. 1 A. Khapli + Kálákusal, short head.

" 36. 21. Khapli + Wheat of Párner.
Rather small, hard red, of not very good quality.

" 37. 39. a. Rangrih + Australian 46.
White glossy, of very good quality.

" 38. 1. Kálákusal + Khapli.
Good hard yellow.

" 39. Naishki, plot 2.
Altogether undesirable.

" 40. Bolani.
Altogether undesirable.

" 41. IX. A. Pivla Násik + Khapli, head short.

" 42. 11 2 a. Khapli + Kálákusal, long heads.

" 43. VIII. Pivla Násik + Khapli.
Good hard yellow.

" 44. Kallah.
Fairly good white Mundi.

" 45. 42. Kempu Godhi + Khapli.
Although the grains are very small the appearance rather good.

" 46. Mundi white + Australian 34, long awns.
Good white Mundi.

Sample No. 47. Kála Gandam.
Undesirable.

" 48. 9. Khapli + Pánsángli.

" 49. 3 c. Khapli + Kálákusal, spikelets large.

" 50. 2 b. Khapli + Kálákusal, hairy head.

" 51. 3 a. Khapli + Kálákusal.

" 52. 1. Khapli + Kálákusal.
Undesirable.

" 53. Safed + Chali.
Undesirable.

" 54. 69. Khapli + Hansia Broach.
Inferior hard red.

" 55. 11 3 b. Khapli + Kálákusal, spikelets broad.
Inferior hard red.

" 56. 111 a. Khapli + Kálákusal.

" 57. 111 c. Khapli + Pánsángli. Head congested.

" 58. 74. Khapli + Pissikhaberia.

" 59. 111 a. Khapli + Pánsángli. Head short.

" 60. 76. Khapli + Sudhe of Rahuri.

" 61. 8. Pánsángli + Khapli.

" 62. 71. Khapli + Pivla Khándesh.

" 63. 50. Hybrid Nágpur + Muzafarnagar.
Soft wheat. Had the grains been slightly bolder, the quality would be very good indeed.

" 64. XI. A. Daudkháni + Khapli. Extra grain.

" 65. 30. Shet of Párner + Khapli.
Hard yellow, containing some proportion of spotted grains. Quality good on the whole.

" 66. 75. Khapli + Lál pissi.

" 67. IX. b. Pivla Násik + Khapli. Extra grains.

" 68. VI. b. Pivla Násik + Khapli. Head long.

" 69. 24. Khapli + Howrah Nágpur.

" 70. 111. b. Khapli + Pánsángli. Head hairy.

" 71. XI. b. Daudhkháni + Khapli. Congested heads.

" 72. 11. 1. b. Khapli + Kálákusal. Long head.

" 73. Australian. 28/32 22.
White Mundi. Very good quality.

" 74. Hansia Broach.
Soft white wheat mixed with some hard yellow. Cannot be sold by itself in Europe.

Sample No. 75. 18. Deshi Athni. Belgaum.

Soft red fairly good, not easily saleable in Europe.

" 76. Koni of Jhelum.

Hard yellow, good in appearance but very small and the grains are under-fed.

" 77. Daudkháni. Damoh.

Far from perfect, soft. Just passable.

" 78. Mundi of Ludhiana.

" 79. Daudkháni A.

Soft wheat; good, but grains are too small.

" 80. Chaval Kátha. Bhandára.

White, mixed with soft and hard yellow.

" 81. Australian. 1/24.

" 82. Australian. 34/25.

" 83. Jowaria. Damoh.

Small round grains and unsaleable in Europe; may find some demand for local consumption.

" 84. Pivla Botka. Báglan, Násik.

" 85. Australian 56/32.

Small round grains and unsaleable in Europe; may find some demand for local consumption.

" 86. Safed of Hoshiárpur.

Small hard yellow with shrivelled and glossy grains.

" 87. Rangrih of Kangra.

Small hard yellow with shrivelled and glossy grains.

" 88. Ghoni of Silhet.

Small yellow, containing too many dead grains, undesirable.

" 89. Kopergaon wheat.

Hard yellow, of very good quality.

" 90. Bansi Bálághát.

Hard yellow, good.

" 91. Australian 13/32. 21.

White Mundi, good.

" 92. Australian 29/32—23.

Soft white, containing too large a percentage of shrivelled and small grains.

" 93. Australian 46/31.

Spotted white Mundi, not very good.

" 94. Dandan of Multan.

Round wheat, would only be used for local consumption.

Sample No. 95. Australian 26/28.
Very good, soft white wheat.

" 96. Dodi of Muzafargarh.
Undesirable.

" 97. Australian 27/29.

" 98. Australian 20/20—20.
White glossy, grains are rather small.

" 99. Pivla Pote, Malegaon.
Undesirable.

" 100. Australian 3/20—19.
Undesirable.

" 101. Daudkháni C.

" 102. Paman Sirsa.
Soft white, fairly good.

" 103. Kálákusal wheat.
Very good, hard yellow.

" 104. Buddha wheat.
Soft red, of a good quality.

" 105. Lál of Batala.
Soft red, rather small.

" 106. Red Deshi of Audh.
Soft red, rather small.

" 107. Potia, Nadiad.
Very good, soft red.

" 108. Malaya, Belgaum.
Spotted red, of difficult sale.

" 109. Safed of Amritsar.
Soft white, good quality but rather small.

" 110. Dadhak, Amritsar.
Hard yellow, good quality.

" 111. Black awned Athni.
Hard red, quality good.

" 112. Farner wheat, obtained at the Nagar Show, 1905.
Very good, hard yellow.

" 113. Shutar Dandam.
Undesirable.

"Nos. 1, 7, 13, 14, 17, 21, 24, 26, 27, 28, 30, 34, 35, 41, 42, 48, 50, 51, 56, 57, 58, 60, 61, 62, 66, 67, 68, 69, 70, 72 and 101 are all hard red wheat, rendered inferior by an admixture of what is called Khapli wheat, and would only be sold on the spot for local consumption.

"All the numbers on which we have not reported represent wheat of a decidedly inferior quality."

Grass Experiments.

30. *Panicum bulbosum.*—Since last year this is standing in a small plot. It seems a perennial grass. It is barely able to survive drought and cannot be cut at intervals to furnish a regular supply of fodder in summer. The grass propagates easily by its bulbs which strike root very readily and it may ultimately prove to be a good grazing grass but probably not superior to many indigenous ones. Further tests as to its feeding value, etc., can be undertaken only when it is propagated on a larger scale so as to ensure a seed supply for an extended area.

31. Italian rye grass, perennial rye grass, *Dactylis glomerata, Festuca elatior, Phleum pratense.*—These were sown in separate beds but all failed to germinate.

Silo.

32. A pit of 1,000 cubic feet capacity was dug in ordinary soil in the gardens to test the value of ensilage of a large quantity of coarse grass. The quantity placed in the pit in September was 26,821 lbs. On being opened in the month of March the yield of cattle feed weighing 20,000 lbs. was abstracted at the rate of 500 lbs. per day until finished. The Superintendent of the Kirkee Civil Dairy reports that the cattle ate it readily and that the peculiar strong smell passed away quickly on exposure to air, leaving the smell of half dried hay. Arrangements have been made this year for the preparations of 6 siloes in *murum* ground in order to permanently maintain the experiment on a larger scale.

Trial with new Plants.

33. The following plants have been introduced into the Gardens for trial :—

Vitis gigantea.
Vitis latifolia.
Schimatoglottis crispata.
Maranta Binote.
Mussænda luteola.
Anæmia rotundifolia.
Dieffenbachia Jenmani.
Scutellaria discolor.
Amomum magnificum.
Billbergia decora.
Aechmea fulgens.
Aechmea sp.
Karatus spectabilis.
Carugata lingulata.
Cryptanthus acaulis.
Passiflora Watsoniana.
Buddleia diversifolia.
Caccalia carnosa.

Strobilanthus colorata.
Hemia myrtifolia.
Pæderia fœtida
Gymnema tingens.
Peristrophe angustifolia.
Eranthemum sp.
Capparis zeylanica.
Sikkim orange.
Tight skinned orange.
Loose skinned orange.
Coffea stenophylla.
Hemerocallis flava.
Tibochina semidecandra.
Salvia Betheli.
Qumquat (Citrus japonica).
Arundo conspicua.
Lemon grass.
Moræa iridioides.
Persian rose.
Rose Leschenaultii.
Dierama pulcherrima.
Romneya Coulteri.
Echeveria glauca.
Aloe horrida.
Mulberry.

Oenothera Lamarckii.
Spiny-leaved Furcrea
Agave vivipara.
Impatiens repens.
Holbœllia latifolia.
Asystasia coromandeliana.
Asystasia violacea.
Billbergia speciosa.
Do. malanthus.
Do. vittata.
Do. pyramidalis.
Do. porteana.
Yucca gloriosa.
Amaryllis Belladonna.
Crinum Moorei.
Galtonia candicana.
Abutilon sp.
Berrya Ammomilla.
Marogogipe Coffee.
Cinnamomum zeylanicum.
Carica Candamariensis.
Abutilon pale pink.
Tacsonia tubuliflora (pink).
" " (white).

Miscellaneous.

34. The following Economic products were sent to the Agricultural Chemist for examination and report as to their oil-bearing properties. The results of his examination run thus :—

1. *Andropogon Schœnanthus.*—Just before flowering.

   Yielded about ·5 per cent. of oil.

2. *Andropogon Schœnanthus.*—After flowering.

   Yielded about ·5 per cent. of oil; showing that the stage of flowering is probably not of consequence.

3. *Andropogon montanus.*

   Yielded nothing.

4. *Andropogon odoratus.*—Leaves and flowers.

   Yielded ·25 per cent. of oil.

5. Roots of *Cyperus rotundus* from Lanowli.

   Yielded no oil by distillation with steam, but of course might give it by other methods.

Owing to want of apparatus the quantities dealt with were far too small but arrangements are being made for a larger installation during the coming season, as the subject of perfume-yielding plants has not received the attention it deserves in India.

35. *Museum.*—The collection now consists of 500 species of sample seeds, 500 samples of cottons and about 1,000 miscellaneous Economic Products including fibres, rubbers, gums, etc.

G. A. GAMMIE,
Economic Botanist.

Poona,
August 1907.

BOMBAY: PRINTED AT THE GOVERNMENT CENTRAL PRESS.

Department of Agriculture, Bombay

ANNUAL REPORT

ON THE

EXPERIMENTAL WORK

OF THE

MIRPURKHA'S AGRICULTURAL S

(Thar and Párkar District, Sind)

FOR THE YEAR

1906-1907

BY

G. S. HENDERSON, N.D.A., N.D.D., ETC.,
Second Deputy Director, Sind.

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Martinus Nijhoff, The Hague.

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1907

Vernacular names of crops, &c., mentioned in the report with their Botanical and English equivalents.

Botanical.	English.	Vernacular.
Cereals.		
Andropogon sorghum *var.* vulgare	Great millet	Jowár (Chapti, Naroli).
Pennisetum typhoideum	Bull-rush millet	Bájri.
Triticum vulgare	Wheat	Gahu.
Zea mays	Maize	Makai.
Pulses.		
Cajanus indicus	Pigeon pea	Tur.
Cicer arietinum	Gram	Chana.
Lens esculenta	Lentil	Masur.
.....	Saidi beans	.....
Oil-seeds.		
Arachis hypogea	Groundnuts	Bhuimug.
Linum usitatissimum	Linseed	Alshi.
Sesamum indicum	Sesamum	Til, Tir.
Fibres.		
Gossypium barbadense	Egyptian and Sea Island Cotton.	Abbassi, Yanovitch, &c.
Do. hirsutum	American Cotton	Viláyati Kapás.
Do. neglectum	Sindhi Cotton	Sindhi Kapás.
Do. arboreum	Tree Cotton	Devkapás.
Corchorus capsularis	Jute	Jute.
Crotolaria juncea	Bombay hemp	San.
Sugars.		
Sachharum officinarum	Sugarcane	Sherdi (Product Gur).
Miscellaneous.		
Phœnix silvestris	Date palm	Khajuri.
.....	Egyptian clover	Berseem.
Trigonella fœnum græcum	Fenugreek	Methi.

THE MIRPURKHA'S AGRICULTURAL STATION, 1906-07.

Established—1904; *Elevation*—approximately 50 feet above sea level; *Soil*—light coloured clay; *North Latitude*—25° 32″; *East Longitude*—69° 2″; *Average rainfall*—6″ 67″; *Temperature*—maximum 116° in May, minimum 42° in February.

Area—52 acres.

Superintendent—Mr. S. B. Mahli, M.R.A.C.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-1907) ...	...	...	0 50	0 22	2 27	3 15	...	...	...	...	1 18	0 24	7 56
Average ...	...	0 8	0 66	1 88	1 18	1 23	...	...	0 2	0 10	1 3	0 53	6 67
Temperature (1906-07)—													
Mean maximum ...	100°	106°	104°	100°	94°	90°	96°	93°	85	82°	75°	87°	...
Mean minimum ...	70°	79°	81°	81°	80°	78°	72°	64°	56°	55°	55°	64°	...

2. This Station was started in October 1904 and has consequently now been in operation for nearly 3 years. The results for the year under report have not been very satisfactory chiefly owing to the causes mentioned in the report for this Station for the year 1905-06.

3. The land is typical of much of the perennially irrigated country in Sind, where the land, naturally a high class alluvium soil, contains alkali patches which are said to be increasing under irrigation. The same phenomenon is widely prevalent in the United States of America. Irrigation sets up capillary action with the highly salt impregnated subsoil layers, with the result that the alkali is transferred to the surface layer.

4. The Station is laid off in 1 acre plots for each of which a separate cultivation sheet is kept. The plots, however, are useless for the purposes of comparative tests, as most of them contain Kalar or alkali patches on which no germination can take place. It will probably be advisable in the future to group the plots into larger areas.

For these reasons also, manurial experiments especially those with artificial fertilisers are at present of little value for comparison.

5. The neighbouring Zemindárs were inclined to criticise the Station management owing to the amount of labour expended in preparatory cultivation for the different crops. An effort will be made in future to keep cultivation charges, etc., within the range of the ordinary cultivator. With a knowledge of the soil and with proper use of water all the cultivation operations can be done cheaply and efficiently with native implements.

Season.

6. The season under report was as usual marked by hot winds from April to June. They have an adverse effect on all vegetation, especially on Egyptian cotton. The leaves wilt up and all growth seems to stop for some weeks; it is then that the plants fall an easy prey to the white ants. It also seems to have considerable delaying effect on the time of flowering and consequently of harvesting.

Experiments with Fibre Crops.

7. *Egyptian Cotton.*—The yields of the cotton plots are as follows:—

No. of plot.	Area.		Variety of cotton.	Time of sowing.	Manure.	Number of waterings.	Yield per acre.
	A.	g.					Lbs.
17	1	0	Abbassi	March ...	6 tons lime ...	16	677
18	1	0	Do.	Do. ...	*Nil* ...	15	442
20	1	0	Do.	April ...	4 tons lime ...	13	457
21	1	0	Do.	March ...	*Nil* ...	12	355
29	0	33	Do.	April ...	4 tons lime and 1 ton bone-meal.	15	158
30	0	33	Do.	Do. ...	4 tons lime ...	15	383
34	1	0	Do. seed grown in Sind.	Do. ...	Do. ...	15	345
37	1	0	Do.	Do. ...	4 tons lime and 1 ton bone-meal.	15	590
0	0	25	Yanovitch	Do. ...	*Nil*	13	272

These results are not particularly good, though still profitable on the average yield at a price of Rs. 14 per maund of 80 lbs. If the land were uniformly "sweet" and proper care were taken of the sowing, there is no reason why an average of 1,000 lbs. per acre might not be expected.

8. *Upland American Cottons.*—Thirty varieties were grown at the Station; from these the following eight have been selected for extended trial:—

i.—Texas long staple.
ii.—Smith's Improved.
iii.—Truitt.
iv.—Tata's Allen Hybrid.
v.—W. A. Cook.
vi.—Henderson Black.
vii.—Boyd's Prolific.
viii.—Texas Big Boll.

9. *Sea Island Cotton.*—Five varieties were grown last season but did not seem suitable for the land.

10. *Local Sindhi Cotton.*—Two plots were grown of which the earlier sown did well and gave a yield of 988 lbs. of seed cotton per acre; its value however is only about Rs. 5 per maund of 80 lbs.

11. *Tree Cottons.*—Seven varieties were sown in a small plot of good land but do not appear to be suitable for the soil and climate of Sind.

12. *Jute and San.*—The jute was not successful, yielding a small crop and poor fibre. San which is grown locally is much more resistant and will grow where jute will not germinate. The fibre is however not of much value. It is probable that hemp would be more successful than jute. It will be tried on the Station.

Cereal Crops.

13. *Wheat.*—The following statement gives the results of the wheat varieties grown at the Station:—

No. of plot.	Area.	Variety.	Month of sowing.	Number of waterings.	Harvest.	Yield per acre.		Valuation.
						Grain.	Straw.	
	Acre.					Lbs.	Lbs.	
8	1	Punjab, Red ...	December.	2	April ...	335	635	Quality poor, rust.
9	1	Sindhi, Red ...	Do. ...	2	Do. ...	730	1,220	Do.
10	1	Sindhi, White ...	November.	3	Do. ...	570	1,700	Rs. 4-2-6 per cwt.
13	1	Nandero ...	December	1	Do. ...	480	840	,, 4-3-0 ,,
19	1	Do. ...	Do. ...	3	Do. ...	1,050	1,952	Do.
22	1	Bubak ...	November.	2	March .	545	845	Do.
36	1	Delhi, White ...	October...	3	Do. ...	1,520	2,130	Do.

The valuation was made by Messrs. Sanday Patrick & Co. of Karáchi.

Rust was exceptionally bad during this season and yields all round were very poor. Consequently the above crops are very satisfactory. On the Station the red wheat suffered the most but that was owing more to the condition of the plots on which they were sown.

14. *Bájri.*—Nine acres were sown with Bájri; the yields per acre were very varying depending on the amount of Kalar in each plot. Natal Bájri was tried against the local variety with indefinite results. The best yield per acre was 623 lbs. of grain in plot 31.

A small quantity of Bullrush millet was sown and the result is very promising. The yield was 750 lbs. of grain per acre. This crop attracted the attention of many cultivators and there was a big demand for the seed. It will be tried on a larger scale this year.

15. *Jowári.*—Chapti Jowár and Naroli from Africa were both sown. All plots were however destroyed by the borer.

16. *Maize.*—One acre was sown with Jawnpur maize. The yield was 613 lbs. grain which was satisfactory. Twelve other varieties of maize were grown for observation.

Experiments with other Crops.

17. *Tur.*—One plot was sown in July on a good piece of land; it came up splendidly and gave a dense mass of foliage about 8 feet high so thick that the pods could not be gathered till the crop was cut in February. The yield of grain was 1,624 lbs. per acre. There is however no market for this in Sind but it is being fed to the cattle with excellent results. It is being grown this year to test its value as a fodder crop and its effect on the soil.

18. *Berseem or Egyptian Clover.*—This crop is particularly suited for rabi cultivation in Sind and is the most valuable fodder crop that can be grown on perennially irrigated lands. It requires great care in the first stages of its growth and is not tolerant of a large amount of alkali. Seed for Sind is this year being obtained from the northern coast lands of Egypt where the conditions of soil more nearly resemble those of Sind. Six plots were sown at the Station in December. This was probably two months too late and the seed was of poor quality; consequently the yield suffered. Some of the plots had a nice

thick growth by February and there is no doubt that a large part of the Station is suitable for the growth of berseem.

19. *Groundnuts.*—Several varieties of groundnuts grown at the Station did not prove successful, the physical texture of the soil not being suited for their growth.

20. *Sugarcane.*—One acre was sown with Sets. It grew well all through and was much remarked on by visitors. Part was made into Gur and part sold for seed at Rs. 10 per $\frac{1}{10}$ acre. On cutting the cane it was found that much of it was attacked by the borer. From 1 guntha cut and weighed 2,680 lbs. cane were obtained yielding 335 lbs. Gur.

21. Among other crops Saidi Beans, Gram, Russian Linseed, Til, Fenugreek and Lentils were tried but all did badly. They are all unsuitable for growing on alkali land.

Date-palms.

22. Thirteen varieties of date-palms, in all 303 plants, were planted at the Station. The Station has not a typical date-palm soil but on the whole the plants that are left are beginning to show signs of growth. Some were planted on alkali land and have died. One hundred and forty plants in all have been removed as dead.

Cross Breeding.

23. Breeding operations in cotton and wheat are being continued but it is still too early for any definite results to be shown.

Mirpurkhás,
August 1907.

G. S. HENDERSON,
Second Deputy Director of Agriculture.

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AND THE

BÁRÁMATI DEMONSTRATION STATION

(Poona District, Deccan)

FOR THE YEAR

1906-1907

BY

F. FLETCHER, M.A., B.Sc., ETC., ETC.,
Ag. Professor of Agriculture.

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Botanical.	English.	Vernacular.
Cereals.		
Andropcgon sorghum var. vulgare...	Great millet ...	Jowár (chapti, Sholápuri, Gidgap, Nilva, &c.).
Do. var. cernuum.	Do. ...	Sundhia.
Pennisetum typhoideum ...	Bull rush millet ...	Bájri.
Triticum sativum ...	Wheat ...	Gahu (Kálákusal).
Do. speltum ...	Spelt ...	Khapli.
Oryza sativa ...	Rice, Paddy ...	Bhát (Ambemohor, Dodka, Kamod).
Elusine corocana	Muma millet ...	Náchani.
Paspalum scrobiculatum ..	Kodra millet ...	Kodra.
Panicum miliaceum	Common millet ...	Sáva, Vari.
Do. italicum ...	Italian millet ...	Rála.
Hordeum vulgare ...	Barley ...	Jav.
Avena sativa ..	Oats ...	Vat.
Zea mays ...	Maize ...	Maka.
Sorghum sachharatum ...	Sorghum ...	Amber, Collier (exotic).
Pulses.		
Cajanus indicus ...	Pigeon pea ...	Tur.
Cicer arietinum ...	Gram ..	Harbhara.
Phaseolus mungo ...	Green gram ...	Mug.
Do. radiatus ...	Black gram ...	Udid.
Do. aconitifolius ...	Kidney bean ...	Math.
Dolichos catiang ...	Cow pea ...	Chavli.
Do. lablab ...	Indian bean ..	Vál.
Do. biflorous ...	Horsegram ...	Kulith.
Pisum sativum ...	Pea ...	Vátána.
Lathyrus sativus ...	Jarosse ...	Lákh.
Ervum lens ...	Lentil ...	Masur.
Oil-seeds.		
Arachis hypogea ...	Groundnuts ...	Bhuimug.
Linum usitatissimum ...	Linseed ...	Javas.
Carthamus tinctorius ...	Safflower ...	Kardai.
Fibres.		
Gossypium herbaceum ...	Cotton ...	Kápus (Broach, Kumpta).
Corchorus Capsularis ...	Jute	
Crotolaria juncea ...	Bombay hemp ...	San.
Sugar.		
Sachharum officinarum .	Sugarcane ...	Us (Product Gul).
Condiments.		
Curcuma longa ...	Turmeric ...	Halad.
Vegetables.		
Ipomæa batatas ...	Sweet potato ...	Ratálu.
Phaseolus vulgaris ...	Fieldbean ...	Shrávan Ghevda.
Fodders.		
Medicago sativa ...	Lucerne ...	Lasun ghás.

I.—THE MA'NJRI AGRICULTURAL STATION, 1906-07.

Established—1894; *North Latitude*—18° 32′; *East Longitude* 74° 2′; *Elevation*—1,850 feet above sea level; *Soil*—medium black and light *murum*; *Average rainfall*—16 inches; *Temperature*—maximum 109° in May, minimum 45° in January.

Area—62¼ acres.

Superintendent—Mr. Hari Krishna Dándekar.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
	′ ″	″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-07)	0 0	0 0	7 56	2 54	2 47	1 59	0 8	0 66	0 26	0 0	0 0	0 0	15 50
Average	0 0	2 10	1 59	4 69	1 49	2 7	3 61	0 11	0 0	0 0	0 0	0 0	15 66
Temperature (1906-07)—													
Mean maximum ...	108°	101°	88°	83°	83°	81°	90°	86°	86°	87°	90°	96°	...
Mean minimum ...	67°	73°	72°	71°	69°	67°	63°	56°	50°	53°	56°	61°	...

Note.—The temperature details are for Poona 8 miles off. The rainfall average is for 3 years only for which data available.

I.—History and Aim of the Station.

2. This Station owes its beginning to the difficulties that were experienced in carrying out the sugarcane experiments at Poona. Up to 1894 sugarcane experiments were carried at Poona. When it became necessary for sanitary reasons to discontinue these experiments there, a tract of 9 acres was leased at Mánjri 8 miles from Poona on the Poona-Sholápur road, in the heart of the sugarcane growing tract, watered by the Mutha Right Bank Canal. In 1895, 13 acres were purchased including the 9 acres already leased. In 1902, 31 adjoining acres were purchased. In 1905, an additional area of 17 acres was purchased.

3. This Station has from the very beginning had for its main line of work experiments connected with the cultivation of sugarcane; and the best methods of utilizing when under irrigation the

shallow soil areas found so frequently alternated with a better class of soil throughout the Deccan. It is a very representative tract of the region.

4. The following lines of experiments for sugarcane were suggested:—

(1) To study the more economic system of manuring cane.

(2) To ascertain the most profitable way in which bone-manure can be used.

(3) To test the various methods of cultivation.

(4) To acclimatize newly imported varieties of sugar-cane from Mauritius.

(5) To compare sugar sorghums with cane as sugar producers.

Questions 2 and 5 have been quite thoroughly settled.

Question 4 has been carried on for 13 years. During the year under report attention was mainly given to question No. 1.

II.—Area and Character of the Soil.

5. Mánjri Station consists of four Survey Nos. 61 to 64 inclusive, a total area of 62 acres 10 gunthas. Of this area 21 acres 38 gunthas are deep black soil, 6 acres light soil and 1 acre 31 gunthas rocky or *murmád* soil. The new and old buildings and the *nála* occupy about 8 acres.

III.—Plotting.

6. For the convenience of experiments the whole area of the Station was permanently plotted this year into five series, leaving a space between each series. Each series was then divided into square one acre fields and the end portions of the series and near the canal were left as irregulars. Each one acre field was then divided into four 10 guntha plots. In all the whole area was divided into 45 one acre fields and 8 irregular fields.

IV.—Lines of Work.

7. Manure experiments to test potash and phosphoric acid requirements for sugarcane and the trial of mineral manures compared with cake and poudrette as top-dressing, water demonstration plots, varieties for distribution that were carried on last year with new cane are carried on this year with ratoon cane.

Varieties of maize, Bájri, Jowár and sweet potatoes were grown for testing, selection and distribution.

Growing of irrigated cotton was continued. Various crops were grown for study of their cultivation, as fieldbeans, Kulthi, Math, Mug, Udid, Náchani, Kodra, Sáva, Vari, Rála, paddy, barley, oats, Khapli, peas, gram, Lang, Masur, and Tur.

V.—Meteorology.

8. The season was on the whole a favourable one. There were no ante-monsoon showers; the preparation of the fields was therefore difficult. On the 7th and 8th of June it rained 3 inches 60 cents. The work of sowing was continued from 19th of June to the 4th of July. The crops were looking well till the end of July. In the first fortnight of August only 2 cents of rain was recorded. The Station crops were therefore irrigated. But in the second fortnight of August 2 inches 45 cents fell which saved all the crops. The whole of October was without rain. The rabi crops had therefore to be sown under irrigation. Although the total amount of rain was only equal to that of the last year, it was better distributed for the kharif season, in the year under report.

VI.—Area planted to different Crops.

9. The statement below shows the area cropped and the purpose of each crop :—

Field No.	Khari crop.	Area.	Purpose.	Rabi crop.	Area.	Purpose.	Remarks.
		A. g.			A. g.		
1	Fieldbeans ...	0 10	To study the most profitable use of the light *murum* soils of the irrigated regions of the Deccan Also selection of seed and methods of cultivation.	Barley ...	0 20	To study the most profitable use of the light *murum* soils of the irrigated regions of the Deccan. Also selection of seed and methods of cultivation.	
	Kulthi ...	0 10		Oats ...	0 20		
	Math ...	0 10					
	Mug ...	0 10					
2	Udid ...	0 10		Khapli ...	0 10		
	Náchani ...	0 10		Peas ...	0 10		
	Kodra ...	0 10		Gram local ...	0 10		
	Sáva ...	0 10		Gram Kábuli	0 10		
3	Vari ...	0 10		Masur ...	0 10		
	Rála ...	0 10		Lang ...	0 10		
3 & 4	Sugarcane ...	0 30	Experiments in harvesting and boiling.	.....	...	.....	
	Do. ...	0 30	Study of the system of planting and cultivation.	.....	...	.....	
A	Do. ...	0 18	For distribution ...	.....	...	.....	
B, 5 to 8	Do. ...	4 0	Manurial experiments .	.....	...	.....	
9	Do. ...	1 0	Water experiments ...	.....	...	.....	
10	Bájri ...	0 20	Comparison and seed selection.	English peas.	0 20	New crop.	
10 & 11	Cotton ...	0 30	To test ratoon cotton under irrigation.	.....	...	.....	

Field No.	Kharif crop.	Area.	Purpose.	Rabi crop.	Area.	Purpose.	Remarks.
		A. g.			A. g.		
11 & 12	Bájri ...	1 20	Comparison and seed selection.	Gram ...	0 20	Seed selection.	
				Masur ...	0 20		
				Lang ...	0 20		
13	Chavli and Maize.	1 0	Fodder	Wheat ...	1 0	Selection of seed and distribution.	
14	Cotton ...	0 30	To test the growing of this type of cotton on the light soil.	.....	...	.....	
14 & 15	Bájri ...	1 10	Seed selection and equalising the land.	.....	...	.....	
16 to 25	Jowár ...	10 0					
26	Do. ...	1 0	To demonstrate the advantages of tillage.	.....	...	.....	
27	Sugarcane ...	1 0	Further test of the Mauritius variety.	.....	...	.....	
28	Do. ...	1 0	To test the most profitable sets for planting.	.....	...	.....	
29	Sweet potatoes	1 0	Comparison of the varieties and raising cuttings for distribution.	.....	...	.....	
30	Tur ...	1 0	Study of the cultivation of this crop as rotation crop.	.....	...	.....	
31	Maize ...	1 0	Seed selection and distribution.	Wheat ...	3 0	Seed selection and distribution.	
32	Sorghum ...	1 0					
33	Sundhia ...	1 0					
34	Maize ...	1 0					
				Linseed ...	0 30	For fibre ...	Fibre was not extracted as the plants had branched too much.
				Safflower ...	0 10	Seed selection.	
35 & 36	Cotton ...	2 0	To ascertain the best time for planting Gujarát cotton.	.....	...	.....	
37 & 38	Sugarcane ...	2 0	To ascertain the best rotation for sugarcane in the Deccan.	.....	...	.....	
39	Cotton ...	0 20	Do. ...	.....	...	.....	
	San for fibre ...	0 20	Do. ...	.....	...	.....	
40	Lucerne ...	1 0	To ascertain the correct quantity of water required for lucerne.	.....	...	.....	
41	Groundnuts ...	0 20	To ascertain the best rotation for sugarcane in the Deccan.	.....	...	.....	
	San green manure.	0 20	Do. ...	.....	...	.....	
42	Bare fallow ...	0 20	Do. ...	.....	...	.....	
	Cotton ...	0 20	Do. ...	.....	...	.....	
43	Tur ...	0 20	Do. ...	.....	...	.....	
	Cotton ...	0 20	Do. ...	.....	...	.....	
44	Jowár .	1 0	To ascertain the quantity of water required for Jowár.	.....	...	.....	Not undertaken this year as the guage was not ready.
45	Rice varieties...	0 20	For comparative test ...	Vál ...	0 20	To ascertain the effect of pulses.	Not carried on this year as the beds could not hold water owing to the new embankments.
	Rice ...	0 20	Water experiments ...				
I r. D	.....	...	.....	American peas.	0 18	For seed.	
E	Groundnut ...	0 30	For seed	.....	...	.....	
I r. I	Jute ...	0 10	For fibre	Khapli ...	0 10	For green fodder.	
J	Groundnut ...	0 18	For seed and distribution.	.....	...	.....	
	Turmeric ...	0 8	For seed	.....	...	.....	
	Nilva ...	0 30	Do.	Sweet potatoes.	0 30	For cuttings.	

VII.—Experiments in Cane and Cultivation of Crops.

A.—Manure Experiments.

10. *Potash manure for sugarcane.*—Last year a series of four plots was selected and manured with potash at the rate of 50 lbs., 100 lbs., 150 lbs. and 200 lbs. per acre in the form of sulphate of potash in addition to 350 lbs. of nitrogen from safflower cake. This year the same experiments are carried on with ratoon, but two-thirds of potash and nitrogen of the last year have been given.

The results with the outturn of the last year are tabulated below for comparison.

No. of experiment.	Manurial treatment per acre.						Results per acre; crop Pundia cane (plant cane, 1905-06; ratoon cane, 1906-07).			
	Kind of manure.	Quantity.	Containing N.	Containing P_2O_5.	Containing K_2O.	Cost of manure.	No. of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.
		Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.		Lbs.	Lbs.	Lbs.
1	Safflower cake ...	3,408	223½	70	39½	115 10 0	22,876	64,076	12,996	47,040
	Sulphate of potash.	...	...	...	...		30,880	88,400	13,724	64,000
2	Safflower cake ...	3,408	223½	70	39½	121 0 0	22,986	67,208	12,716	48,836
	Sulphate of potash.	56	...	...	27		26,120	70,440	11,232	52,000
3	Safflower cake ...	3,408	223½	70	39½	127 10 0	25,664	70,304	14,620	53,612
	Sulphate of potash.	125	...	...	60½		30,420	88,476	16,272	63,000
4	Safflower cake ...	3,408	223½	70	39½	134 2 0	24,644	72,820	14,204	53,104
	Sulphate of potash.	195	...	...	39½		31,040	88,172	16,728	63,000

No. of experiment.	Kind of manure.	Results per acre; crop Pundia cane (plant cane, 1905-06; ratoon cane, 1906-07).							
		Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.	Year.
			Lbs.			Rs. a. p.	Rs. a. p	Rs. a. p.	
1	Safflower cake ...	74·3	9,460	19·8	14·7	271 9 4	591 4 0	319 10 8	1906-07
	Sulphate of potash.	76·8	10,444	16·2	12·5	291 14 4	696 4 3	404 5 11	1905-06
2	Safflower cake ...	72·6	9,056	18·5	13·5	278 15 8	566 0 0	287 0 4	1906-07
	Sulphate of potash.	73·9	8,396	16·1	11·8	288 11 0	559 11 11	271 0 11	1905-06
3	Safflower cake ...	75·9	10,280	19·3	14·6	295 4 0	642 8 0	347 4 0	1906-07
	Sulphate of potash.	78·6	11,452	16·8	13·3	318 6 8	763 7 4	445 0 8	1905-06
4	Safflower cake ...	75·9	10,252	19·3	14·8	300 12 0	640 12 0	340 0 0	1906-07
	Sulphate of potash.	76·6	11,620	17·9	13·1	325 12 4	774 10 8	448 14 4	1905-06

These results clearly show that there is an increase of outturn by potash manure. Further experiments with increased quantity of potash are necessary.

11. *Phosphoric acid requirements for sugarcane.*—Many questions were received from cultivators with regard to the use of bones in some form as a sugarcane manure. To settle this question a series of four plots was laid out last year and manured with 50 lbs., 100 lbs., 150 lbs. and 200 lbs. of phosphoric acid in the form of superphosphate in addition to 350 lbs. of nitrogen from safflower cake. This year the same experiments are carried with the ratoon cane, but two-thirds of phosphoric acid and nitrogen of the last year have been given.

Plots 1 and 2 being manured alike last year as the quantity of cake contains more than 100 lbs. of P_2O_5, plot 1 was converted into a complete manure plot this year and hence sulphate of potash was also given in addition to cake and superphosphate.

The results with the outturn of the last year are tabulated below for comparison.

Manurial treatment per acre.							Results per acre; crop Pundia cane (plant cane, 1905-06; ratoon cane, 1906-07).		
No. of experiment.	Kind of manure.	Quantity.	Containing N.	Containing P_2O_5.	Containing K_2O.	Cost of manure.	No. of canes.	Weight of canes stripped and topped.	Weight of tops.
		Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.		Lbs.	Lbs.
1	Safflower cake	3,408	233½	70	39⅔	150 9 0	23,496	57,716	12,996
	Sulphate of potash ...	195	...	...	93⅔				
	Superphosphate	184	...	63½	...		35,948	87,944	17,136
2	Safflower cake	3,408	233½	70	39⅔	115 10 0	22,920	55,100	12,092
	Superphosphate	...	...	...	...		26,284	65,288	11,732
3	Safflower cake	3,408	233½	70	39⅔	128 1 0	22,024	49,444	10,272
	Superphosphate	88	...	30	...		30,088	86,740	15,444
4	Safflower cake	3,408	233½	70	39⅔	131 3 0	18,096	38,556	8,724
	Superphosphate	184	...	63½	...		29,365	77,724	13,048

No. of experiment.	Kind of manure.	Results per acre; crop Pundia (plant cane, 1905-06; ratoon cane, 1906-07).								
		Weight of juice obtained.	Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn	Profit.	Year.
		Lbs.		Lbs.			Rs. a. p.	Rs. a. p.	Rs. a. p.	
1	Safflower cake Sulphate of potash	41,868	72·5	8,096	19·3	14·9	297 0 0	506 0 0	209 0 0	1906-07
	Superphosphate	68,000	77·3	11,952	17·5	13·6	294 2 8	792 12 8	498 10 0	1905-06
2	Safflower cake ...	38,580	70·01	7,680	19·9	14·0	257 0 0	490 0 0	233 0 0	1906-07
	Superphosphate ...	53,000	79·6	9,296	17·9	14·2	279 2 4	619 11 8	340 9 4	1905-06
3	Safflower cake ...	34,716	71·6	6,632	19·1	13·7	257 2 0	414 8 0	157 6 0	1906-07
	Superphosphate ...	68,000	78·4	11,876	17·4	13·7	307 11 8	791 13 0	484 2 1	1905-06
4	Safflower cake ...	26,788	69·4	5,252	19·6	13·6	249 10 0	328 4 0	78 10 0	1906-07
	Superphosphate ...	60,000	77·02	10,406	17·6	13·5	312 13 4	702 10 8	389 13 4	1905-06

These results show that there is no increase in the outturn by using larger amount of phosphoric acid. These experiments may therefore be discontinued.

12. *Top-dressing for sugarcane.*—To compare the value of different nitrogeneous manures, including mineral manures, a series of five plots was manured last year with 200 lbs. of nitrogen in the form of farmyard manure and 150 lbs. nitrogen in the form of various top-dressings, plot 1 receiving all nitrogen from farmyard manure in the beginning.

This year the dressing given to these plots was similar to that of the last year's top-dressings, but only 233⅓ lbs. of nitrogen per acre was supplied. Plot 1, which received only one application of farmyard manure last year, received the same dressing as the second plot and the residual effect of the farmyard manure will be observed.

The results with the outturn of the last year are tabulated below for comparison.

No. of experiment.	Manurial treatment per acre.						Results per acre; crop Pundia (plant cane, 1905-06; ratoon cane, 1906-07).			
	Kind of manure.	Quantity.	Containing			Cost of manure.	Number of canes	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.
			N.	P_2O_5.	K_2O.					
		Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.		Lbs.	Lbs.	Lbs.
1	Safflower cake ...	3,408	233½	70	39½	115 10 0	20,300 24,450	44,264 40,368	8,576 6,888	31,492 28,000
2	Do. ...	3,408	233½	70	39½	115 10 0	24,524 30,304	49,800 49,828	10,612 13,044	34,444 36,000
3	Nitrate of soda ...	1,505	233½	...	...	171 4 0	21,208 29,208	50,716 53,316	11,672 11,716	35,320 40,000
4	Poudrette ...	22,807	233½	319¾	198½	200 0 0	24,072 25,744	51,996 52,648	13,452 9,740	36,688 40,000
5	Crude nitre ...	1,800	233½	...	...	205 0 0	30,880 27,796	74,840 71,128	15,584 15,088	52,496 56,360

No. of experiment.	Kind of manure.	Results per acre; crop Pundia (plant cane, 1905-06; ratoon cane, 1906-07).							
		Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.	Year.
			Lbs.			Rs. a. p.	Rs. a. p.	Rs. a. p.	
1	Safflower cake ...	71·1	5,596	17·6	12·6	241 14 0	349 12 0	107 14 0	1906-07
		69·3	5,096	18·2	12·6	221 11 4	339 11 9	118 0 5	1905-06
2	Do. ...	69·8	6,104	17·7	12·4	247 4 0	381 8 0	134 4 0	1906-07
		72·4	5,204	17·2	12·4	248 2 8	413 9 11	165 7 3	1905-06
3	Nitrate of soda...	69·6	6,420	18·2	12·7	304 0 0	401 4 0	97 4 0	1906-07
		75·02	6,952	17·4	13·4	344 9 4	463 7 5	118 13 7	1905-06
4	Poudrette ...	70·5	6,812	18·5	13·1	323 9 0	425 12 0	102 3 0	1906-07
		75·5	7,212	18·03	13·6	299 13 0	480 12 10	180 15 10	1905-06
5	Crude nitre ...	70·1	9,724	18·5	12·9	227 15 0	605 12 0	377 13 0	1906-07
		79·2	9,632	17·02	13·5	382 3 8	642 2 3	259 8 7	1905-06

From these results it will be seen that the plot of crude nitre comes first, of poudrette second, and that of nitrate of soda comes third in point of outturn.

13. *Mineral manures.*—As mineral manures have been brought to the attention of cultivators considerably of late, it is deemed advisable to compare them with safflower cake. Two plots were therefore manured, one with nitrate of soda and the other with safflower cake.

The application of nitrate of soda was made in three dressings last year. Two-thirds of the manures were given this year, but nitrate of soda was given in 21 applications before an equal number of waterings.

The results with the outturn of last year are tabulated below for comparison.

No. of experiments.	Manurial treatment per acre.						Results per acre; crop Pundia (plant cane, 1905-06; ratoon cane, 1906-07).			
	Kind of manure.	Quantity.	Containing.			Cost of manure.	Number of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.
			N.	P_2O_5.	K_2O.					
		Lbs.	Lbs.	Lbs	Lbs.	Rs. a. p.		Lbs.	Lbs.	Lbs.
1	Safflower cake ...	3,408	233½	70	39¾	115 10 0	25,516 29,988	53,068 80,838	13,493 13,644	37,481 64,000
2	Nitrate of soda ...	1,505	233½	...	...	171 4 0	26,564 29,304	50,988 70,243	13,261 10,600	35,556 56,000

No. of experiments.	Kind of manure.	Results per acre; crop Pundia (plant cane, 1905-06; ratoon cane 1906-07).							
		Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit	Year.
			Lbs.			Rs. a. p	Rs. a. p.	Rs. a. p.	
1	Safflower cake ...	70·6	7,140	19·0	13 5	354 8 0	446 4 0	191 12 0	1906-07
		79·1	11,372	17·8	14·07	235 6 8	788 2 1	462 11 5	1905-06
2	Nitrate of soda ...	69·5	6,524	18 3	12·8	302 12 0	407 12 0	105 0 0	1906 07
		79·7	9,492	16 9	13·5	473 1 8	632 12 8	159 11 0	1905-06

The safflower cake gave more outturn of Gul.

14. An experiment with a balanced manure containing all the elements of plant food was attempted last year. The crop received only two-thirds of the manure this year. It is interesting to compare this plot with the first plot of phosphoric acid manure experiment as this plot has also received a similar dressing.

The results with the outturn of the last year are tabulated below.

No. of experiment.	Manurial treatment per acre.						Results per acre; crop Pundia (plant cane, 1905-06; Ratoon cane, 1906-07).			
	Kind of manure.	Quantity.	Containing. N.	Containing. P_2O_5.	Containing. K_2O.	Cost of manure.	Number of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.
		Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.		Lbs.	Lbs.	Lbs.
1	Nitrate of soda ...	1,505	233½	...	...	142 14 0	33,400	83,696	17,768	59,144
	Sulphate of potash.	139	...	...	66¾					
	Superphosphate ...	195	...	66¾	...		39,712	97,088	17,040	76,000

No. of experiment	Kind of manure.	Results per acre; crop Pundia (plant cane, 1905-06; Ratoon cane, 1906-07).							
		Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.	Year.
			Lbs.			Rs. a. p.	Rs. a. p.	Rs. a. p.	
1	Nitrate of soda ...	70·4	11,340	19·2	13·5	318 8 0	708 12 0	390 4 0	1906-07
	Sulphate of potash.								
	Superphosphate ...	76·2	13,044	17·2	13·4	534 12 4	869 9 7	334 13 3	1905-06

B.—Irrigation Experiments.

15. *Sugarcane.*—A demonstration irrigation plot was put down to Pundia cane and the results are in accordance with those of the previous year, that is apparently in favour of the smaller supply of water.

The details are given below.

Details of Irrigation.				Results per acre; crop Pundia (ratoon).				
Each watering equal to inches of rainfall.	Interval between each watering Days.	Number of waterings.	Quantity of water in cubic feet exclusive of rainfall.	Number of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.	Percentage of juice to cane.
					Lbs.	Lbs.	Lbs.	
2½	10	31	223,862	26,674	55,330	13,484	39,466	71·3
4½	15	20	269,237	21,534	46,720	10,816	33,758	72·2

Results per acre; crop Pundia (ratoon).						
Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.	Outturn of Gul last year.
Lbs.			Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.
7,940	14·4	20·1	258 9 0	456 4 0	237 11 0	7,228
6,582	14·1	19·5	246 0 0	411 6 0	165 6 0	6,068

16. *Lucerne.*—To ascertain the quantity of water required for lucerne a field was divided into six plots. They were irrigated as follows :—

Plot.	Interval of days.	Quantity of water= inches of rain.
1	5	1
2	5	2
3	7	2
4	7	3
5	10	2
6	10	3

Lucerne was sown on the 28th of April, but it was attacked by mealy wings (Aleurodidæ). It was therefore resown on the 22nd of November.

As there was only one cutting till the end of March the outturn is not given.

C.—New Methods of Cultivation.

17. *Sugarcane.*—The methods used in the cultivation of this crop in the Deccan are so labourious that they could only be employed in a land where labour is very cheap, and even here it is thought that part of the expensive process of weeding and earthing could be done by bullock power. Different widths between the rows are being tried to see which will be the best for bullock cultivation. The usual dressing of farmyard manure and safflower cake has been given.

The results are tabulated below.

System of planting.		Results per acre; crop Pundia (ratoon).										
Number of experiment.	Distance between the ridges in feet.	Number of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.	Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.
			Lbs	Lbs.	Lbs.		Lbs.			Rs. a. p.	Rs. a. p.	Rs. a. p.
1	2	29,348	69,696	11,444	50,040	71·8	8,620	17·2	12·4	371 3 0	594 8 0	223 5 0
2	3	20,552	59,896	8,592	39,200	65·5	6,528	16·6	10·9	365 1 0	450 3 4	85 2 4
3	3½	21,672	69,784	9,160	42,600	61·0	7,320	17·5	10·2	350 15 0	504 13 4	153 14 4

18. *Jowár.*—Of the two plots of Jowár one was intercultured with the Planet Junior hoe every week as long as the bullocks were able to walk through the rows and the other was not intercultured.

The intercultured plot being the end plot of the series was so much attacked by birds that the outturn of the two plots cannot be compared.

The yields are given below.

Number of experiment.	Tillage.	Yield per acre; crop Jowár.			
		Grain.	Fodder.	Value of outturn.	Cost of cultivation.
		Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
1	Not intercultured	140	6,800	26 2 8	27 5 2
2	Intercultured	224	6,960	28 12 6	28 7 2

D.—System of planting.

19. Several times in the past, experiments with the planting of the tops and butts of sugarcane have been tried at Mánjri, but it is not carefully recorded what is meant by tops. In some places only the leafy portion of the top is planted.

Three plots have been planted this year as follows :—Plot 1 top or upper third of the cane; 2nd butts; 3rd mixed as they come. An experiment in ratooning and transplanting cuttings has been added. All these plots are manured with fish manure and *gurál* ashes.

The details of the experiment are given below. The transplanted plot being very late has not yet been harvested. The result is contrary to those ordinarily obtained from experiments on this point.

Number of experiment.	System of planting.	Results per acre; crop Pundia.					
		Number of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice.	Percentage of juice to cane.	Weight of Gul.
			Lbs.	Lbs.	Lbs.		Lbs.
1	Tops	24,168	69,332	12,052	47,120	67·5	9,004
2	Butts	30,280	70,912	12,528	48,756	68·8	9,380
3	Mixed, as they come ...	27,976	71,185	11,452	48,143	67·6	9,043

Number of experiment.	System of planting.	Results per acre; crop Pundia.				
		Percentage of Gul. to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.
				Rs. a. p.	Rs. a. p.	Rs. a. p.
1	Tops	19·6	12·3	410 11 0	620 15 4	210 4 4
2	Butts	19·2	13·2	414 5 0	646 14 4	232 9 4
3	Mixed, as they come ..	17·9	12·7	437 4 8	623 11 6	186 6 10

E.—Rotation Experiments.

20. *Rotation experiments for sugarcane for block system of irrigation.*—To ascertain which are the most profitable crops to rotate with sugarcane in the block system of irrigation, 6 acres are devoted to rotation experiments and three-year, four-year, and six-year rotations have been made out.

The following is the list of the rotations :—

Plot.	Rotations.	Year.	Crop.
1	Three-year	1906-07	Bare fallow.
		1907-08	Cane.
		1908-09	Cane ratoon.
2	Do. ...	1906-07	San for manure.
		1907-08	Cane.
		1908-09	Cane ratoon.
3	Do. ...	1906-07	Groundnuts.
		1907-08	Cane.
		1908-09	Cane ratoon.
4	Do. ...	1906-07	Cane.
		1907-08	Cane ratoon.
		1908-09	San for fibre.
5	Do. ...	1906-07	Cane.
		1907-08	Cane ratoon.
		1908-09	Jowár.
6	Four-year.	1906-07	Cotton.
		1907-08	San for fibre.
		1908-09	Cane.
		1909-10	Cane ratoon.
7	Do. ...	1906-07	Tur.
		1907-08	Fodder Jowár.
		1908-09	Cane.
		1909-10	Cane ratoon.
8	Four year.	1906-07	Cotton.
		1907-08	Groundnut.
		1908-09	Cane.
		1909-10	Cane ratoon.
9	Do. ...	1906-07	San for fibre.
		1907-08	Fodder Jowár.
		1908-09	Cane.
		1909-10	Cane ratoon.
10	Six-year .	1906-07	Cane.
		1907-08	Cane ratoon.
		1908-09	Cotton.
		1909-10	Tur.
		1910-11	Jowár.
		1911-12	San for fibre.
11	Do. ...	1906-07	Cane.
		1907-08	Cane ratoon.
		1908-09	Cotton.
		1909-10	Groundnut.
		1910-11	Jowár.
		1911-12	San for fibre
12	Do. ...	1906-07	Cotton.
		1907-08	San for fibre.
		1908-09	Wheat.
		1909-10	Jowár.
		1910-11	Cane.
		1911-12	Cane ratoon.

In all these cases of rotations the usual country manures, *viz.* fish manure and oil cake, etc., will be supplied to sugarcane. Other plots will be manured as they require it. As these plots have been replaced by a more complete and definite series, the yields are not given.

F.—Treatment of Murum Soils.

21. *Cotton.*—A portion of the irrigated tracts of the district consists of light *murum* soil, and the best and the most economical system of managing these soils is under investigation. One of the crops suggested for these soils is cotton of the Hirsutum type, and as the Dhárwár-American is the only variety of which seed was available it has been selected. It was sown according to three different methods. The first plot was sown in July according to the Dhárwár method, the second plot in July on ridges 3 feet apart, and the third on ridges 3 feet apart in September. The following are the results of the experiment:—

Crop, cotton Dhárwár-American.			Per acre.			
Plot.	Method of sowing.	Date of sowing.	Outturn seed cotton.	Cost of cultivation.	Value of outturn.	Loss.
			Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1	Ordinary	July ...	304	28 2 0	25 5 4	2 12 8
2	Three feet apart on ridges .	July ...	132	32 8 0	11 0 0	21 8 0
3	Do. ...	September ...	20	19 14 0	1 10 8	18 3 4

22. *Cereals and Pulses.*—The remaining portion of the light soil area was divided into ten 10-guntha plots. Five plots were cropped with kharif pulses and rabi cereals and the other five with kharif cereals and rabi pulses, to see which of the systems or which crops are most paying and what manures are necessary for them.

The statement below shows the details of the experiment.

Name of Crop.	Results per acre.				Remarks.
	Outturn grain.	Cost of cultivation.	Value of outturn.	Profit (+) or loss (−).	
	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p	
Kharif—Fieldbeans ...	840	17 3 7	70 0 0	+52 12 5	
Rabi—Barley ...	480	21 2 0	12 0 0	−9 2 0	
Total ...	...	38 5 7	87 0 0	+43 10 5	
Kharif—Kulthi ...	320	17 3 7	8 0 0	−9 3 7	
Rabi—Barley ...	480	21 2 0	12 0 0	−9 2 0	
Total ...	...	38 5 7	20 0 0	−18 5 7	

Name of Crop.	Results per acre.				Remarks.
	Outturn grain.	Cost of cultivation.	Value of outturn.	Profit (+) or loss (−).	
	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Kharif—Mug ...	640	17 3 7	16 0 0	—1 3 7	
Rabi—Oats ...	784	21 2 0	23 9 8	+2 7 8	
Total ...	...	38 5 7	39 9 8	+1 4 1	
Kharif—Math ...	56	17 3 7	1 6 4	—15 13 3	
Rabi—Oats ...	784	21 2 0	23 9 8	+2 7 8	
Total ...	...	38 5 7	25 0 0	—13 5 7	
Kharif—Udid ...	952	17 3 7	23 13 0	+6 9 5	
Rabi—Khápli ...	808	23 14 0	20 1 8	—3 12 4	
Total ...	...	41 1 7	43 14 8	+2 13 1	
Kharif—Náchni ...	660	10 14 0	16 8 0	+5 10 0	
Rabi—Peas ...	32	10 15 0	1 9 7	—8 7 5	
Total ...	...	21 13 0	18 1 7	—3 11 5	
Kharif—Kodra ...	300	10 14 0	7 8 0	—3 6 0	
Rabi—Gram ...	952	12 4 0	31 11 10	19 7 10	
Total ...	...	23 2 0	39 3 10	+16 1 10	
Kharif—Sáva ...	...	...	...	... ..	Grubbed up as it was not promising.
Rabi—Gram Kábuli ...	152	12 4 0	5 1 0	—7 3 0	
Total ...	...	12 4 0	5 1 0	—7 3 0	
Kharif—Vari ...	...	...	...	.....	Grubbed up as it was not promising.
Rabi—Masur ...	376	17 0 0	18 12 10	+1 12 10	
Total ...	...	17 0 0	18 12 10	+1 12 10	
Kharif—Rála ...	424	10 14 0	10 8 0	—0 6 0	
Rabi—Lang ...	1,288	17 0 0	51 8 0	+34 8 0	
Total ...	...	27 14 0	62 0 0	+34 2 0	

VIII.—New Crops.

23. *Cotton.*—The great demand for cotton has led to try every possible means of growing a long stapled cotton. It does not seem possible to raise with profit the Egyptian or American varieties anywhere on the black cotton soil; but the Broach type of cotton will grow very well in soils where there is sufficient supply of moisture. Experiments were commenced in 1904 to ascertain the value of this crop and the best methods of growing it. In May 1905, 30 gunthas of Broach cotton were

sown. This gave a fair outturn; but an inoppurtune rain in January caused a set of bolls to fall. As the cotton was bearing in May 1906, it was decided to carry the plants over to see what results will be obtained with the plants two years old. The plants were pruned to half their growth and manured and intertilled.

The results of the experiment with those of the last year are tabulated below for comparison.

Crop.	1905-06.		1906-07.		
	Outturn per acre seed cotton.	Value of Outturn.	Outturn per acre seed cotton.	Cost of cultivation.	Value of outturn.
	Lbs.	Rs. a. p.	Lbs.	Rs. a. p.	Rs. a. p.
Broach	429	35 12 0	143	29 5 4	14 4 9

24. The best time for sowing Broach cotton under irrigation has not yet been established; to ascertain this eight plots of 10 guntha each were sown half with Broach and half with Kumpta cotton at an interval of a fortnight from the 15th of March.

The following statement shows the inconclusive results of the experiment:—

Results per acre.

Date of sowing.	Variety.	Outturn seed cotton.	Cost of cultivation.	Value of outturn.	Profit (+) or loss (−).	Remarks.
		Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
15th March ...	Broach ...	680	103 9 8	84 0 0	−19 9 8	This plot received extra water from the adjoining field.
Do. ...	Kumpta ...	872		72 10 8	−30 15 0	
1st April ...	Broach ...	480	81 13 8	48 0 0	−33 13 8	
Do. ...	Kumpta ...	872		72 10 0	−9 3 8	
15th April ...	Broach ...	392	76 5 8	39 3 4	−37 2 4	
Do. ...	Kumpta ...	768		64 0 0	−12 5 8	
1st May ...	Broach ...	672	71 9 8	67 3 4	−4 6 4	
Do. ...	Kumpta ...	661		55 5 4	−16 4 4	
15th May ...	Broach ...	704	56 11 8	70 6 0	+13 10 4	
Do. ...	Kumpta ...	592		49 5 4	−7 6 4	
1st June ...	Broach ...	624	59 7 8	62 0 0	+2 8 4	
Do. ...	Kumpta ...	504		42 0 0	−17 7 8	
15th June ...	Broach ...	464	51 7 0	46 6 0	−5 1 0	
Do. ...	Kumpta ...	368		26 10 8	−24 12 4	
1st July ...	Broach ...	440	55 11 8	44 0 0	−11 11 8	
Do. ...	Kumpta ...	448		36 4 0	−19 7 8	

25. *Jute.*—Jute was sown on a small plot of 11 gunthas. Half was sown with drill and half was broad-casted. It was sown in black soil. As the seed was received very late, it was not sown before the 3rd of July. This plot was adjoining to the main irrigation distributary and hence received seepage water. The plants were 4 feet high when they were cut. The cost of extraction of the fibre is small compared to San.

The statement below gives the outturn.

Name of crop.	Results per acre.			
	Outturn of fibre.	Value of outturn.		
	Lbs.	Rs.	a.	p.
Jute	72	9	0	0

26. *Sugarcane*—Mr. Mollison imported two varieties of sugarcane from Mauritius, and these have been grown at this Station ever since. The red variety yielded, in 1904, 55½ tons of stripped canes which is over 10 tons higher than Pundia, and although the Gul obtained was less than that from the Pundia, it seemed desirable to try this variety on a larger area. Accordingly one acre was put down to this crop dressed with fish manure, *gurál* ashes and safflower cake.

The following statement gives the results; these cannot apparently be compared with any of the Pundia plots:—

Crop.	No. of canes.	Weight of canes stripped and topped.	Weight of tops.	Weight of juice obtained.	Percentage of juice to cane.	Weight of Gul.	Percentage of Gul to juice.	Percentage of Gul to cane.	Cost of cultivation.	Value of outturn.	Profit.
		Results per acre.									
		Lbs.	Lbs.	Lbs.		Lbs.			Rs. a. p.	Rs. a. p.	Rs. a. p.
Red Mauritius ..	25,816	84,816	11,235	64,403	75·9	8,453	13·1	9·9	431 3 2	582 15 5	151 12 3

IX—Comparative variety tests.

27. *Bájri.*—Two varieties of Bájri (Nadiád and Bhávnagar) are found in Gujarát which yield larger outturn of superior character to the ordinary country Bájri. If these are grown on lands full of plant food from sugarcane cultivation and watered a little they will yield a paying crop.

The statement below gives the results.

Name of crop.	Results per acre.				
	Outturn.		Cost of cultivation.	Value of outturn.	Profit.
	Grain.	Fodder.			
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Nadiád	1,080	5,200	26 5 8	62 0 0	35 10 4
Bhávnagar	1,120	5,230	27 2 4	63 7 8	36 5 4

Awned Bájri.—The awned character of this variety is not thoroughly fixed. To fix this and to select the seed 1 acre 20 gunthas were sown with this variety.

The following statement shows the outturn and cost of cultivation :—

Name of crop.	Results per acre.					
	Outturn.		Cost of cultivation.	Value of outturn.	Profit.	Remarks.
	Grain.	Fodder.				
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Awned Bajri ...	466	1,724	16 5 7	24 3 10	7 14 3	Much attacked by birds.

28. *Jowár.*—In order to equalize the land for next year's sugarcane experiments, 5 varieties of Jowár were grown for seed selection and distribution. As these plots were between the two series of sugarcane the outturn was much lessened by birds who found shelter in the sugarcane crops, although special care was taken to scare them away. Varieties which ripened late were most affected. It has been decided to discontinue growing Jowár for seed from next year at this Station.

The following is the outturn of each variety :—

Name of variety.	Results per acre.				Remarks.
	Outturn.		Cost of cultivation.	Value of outturn.	
	Grain.	Fodder.			
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Sholápuri	533	7,484	28 12 7	41 5 3	All the Jowár varieties were much attacked by birds and hence the outturn so low, and as the watching charges were heavy (Rs. 14-0-0 per acre) the cost of cultivation is high.
Perio	378	7,551	30 4 10	34 10 1	
Chapti	345	6,357	29 4 1	30 2 4	
Khondi	806	5,238	27 5 6	37 4 0	
Gidgap	73	6,270	26 5 3	20 15 9	

29. *Rice.*—Three varieties of paddy were grown for comparison. At the same time to see if there is any advantage in growing rabi pulses in the rice beds, half the plot of each variety was sown with Vál this year in the rabi season.

The following statement gives the results of the experiment:—

Crop.	Results per acre.								
	Outturn of grain.	Cost of cultivation.			Value of outturn.		
	Lbs.	Rs.	a.	p.	Rs.	a.	p.
Ambemohor	926	51	6	8	29	4	0
Kamod	840	51	6	8	26	4	0
Dodka	1,212	51	6	8	37	14	3

30. *Fodder crops for grain.*—A large amount of seed is required for sowing fodder on the agricultural Stations. Two varieties of Jowár—Sorghum and Sundhia—and two varieties of American maize—Golden Beauty and Yellow Dent—were grown. Golden Beauty was much damaged by wild pigs.

The following statement gives the outturn of these fodders:—

Name of crop.	Outturn per acre.								
	Outturn.		Cost of cultivation.			Value of outturn.		
	Grain.	Fodder.							
	Lbs.	Lbs.	Rs.	a	p.	Rs.	a.	p.
Sorghum	985	2,520	20	2	11	33	0	3
Sundhja	1,050	1,470	20	11	11	33	5	7
Golden Beauty ...	1,321	2,010	24	4	0	41	11	6
Yellow Dent	865	1,225	25	1	0	32	1	5

X.—Miscellaneous crops.

31. Gram, Masur and Lang were grown after Bájri to improve the land. Gram was damaged by wild pigs.

32. Three American varieties of *sweet potato* were grown for further test and for distribution. Much damage was done to sweet potatoes by wild pigs. These varieties are inferior in taste to the local ones. They were therefore sold very cheap at one-third the average price of the local sweet potatoes.

33. Blue and white flowered *linseed* were grown for fibre, but as the plants were branchy they were allowed to go to seed. As the seed of Russian linseed was not available the plot was sown with safflower. Safflower was very badly affected by aphides. Kerosine emulsion was tried on a small portion, but it produced no effect.

34. *Tur* (Arhar) was grown for seed distribution, but as it was affected by wilt disease, all the plants were uprooted as they withered.

35. *Wheat* (Kálákusal) was grown after harvesting fodder Jowár and maize. This variety of wheat was found at the Nagar Exhibition last year. The seed is hard and heavy.

36. Pondicherry *groundnuts* were grown on a small area. This seed was newly imported. The germination of this was not good.

The statement below shows the results of these miscellaneous crops.

Name of Crop.	Results per acre.			Remarks.
	Outturn of grain.	Cost of cultivation.	Value of outturn.	
	Lbs.	Rs. a. p.	Rs. a. p.	
Gram	786	14 10 0	26 3 2	
Masur	350	16 8 0	17 8 0	
Lang	1,504	24 13 6	60 2 6	
Nansemond	2,657	92 6 0	31 4 0	Watching charges too high. These sweet potatoes are not liked by the public and hence they were sold at low price.
Virginia	1,834			
New Jersey	824			
Linseed, blue flowered ...	398	17 12 0	16 2 8	
„ white flowered ..	588	17 12 0	24 8 0	
Wheat (Kálákusal) ...	285	20 13 9	14 6 6	
Groundnut (Pondicherry) .	1,377	30 6 0	68 13 6	
Vál	557	27 12 9	17 6 6	

37. The experiments referred to in this report were planned by Mr. Knight.

Poona,
September 1907.

F. FLETCHER,
Acting Professor of Agriculture.

II.—THE BA'RA'MATI DEMONSTRATION STATION, 1906-07.

Established—1906; *North Latitude*—18° 8′; *East Longitude*—74° 37′; *Elevation*—1,774 feet above sea level; *Soil*—light and heavy black; *Average rainfall*—22 inches.

Area—10¾ acres.

Overseer—Mr. P. K. Bhágwat.

Season.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
Bárámati.	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-07)	0 0	0 38	4 86	1 9	10 3	5 5	1 2	0 40	0 13	0 0	0 0	0 0	23 86
Average	0 0	2 17	3 90	2 65	1 53	6 65	3 81	0 69	0 0	0 0	0 0	0 0	21 30
Wadgaon (near Hol).													
Rainfall (1906-07)	0 0	1 6	4 56	0 67	10 92	2 82	0 0	2 23	0 0	0 0	0 0	0 0	23 25

I.—Introduction.

2. These demonstrations consist of three detached plots. Two near the town of Bárámati and one at Hol about 17 miles from Bárámati. One of the two plots near Bárámati is a light soil plot and measures one acre, the other plot has a heavy black soil and measures 3 acres 27 gunthas. These two plots are rented at an annual rent of Rs. 54.

The plot at Hol has been lent by Ráo Báhádur B. M. Kenjale on the condition that the Agriculture Department is to supply only the manure and the owner to take the produce in return for the cultivation charges.

All the three plots are under the command of irrigation from the Nira Canal.

The plots near Bárámati are devoted to the cultivation of Broach cotton under irrigation and the plot at Hol to irrigation and manurial experiments with sugarcane.

The demonstrations were commenced in 1906 under Government Resolution No. 5126, dated 25th May 1906. They had their origin in the investigation of the question of water-logging and saline efflorensence in the Bárámati tract.

II.—Meteorology.

3. The monsoon commenced timely in June and was sufficient for sowing of kharif crops. In the month of July rain was in defect of the average, but was sufficient for the standing crops. The rainfall in August was much in excess of the usual quantity. Heavy rain in the third week of September caused the cotton plants to lodge. The crop continued in fairly good conditions till January when cloudly weather caused bolls and flowers to fall. The unusual rain in April 1907 affected the outturn of cotton which was then being picked. The season was on the whole a fair one.

III.—Cotton Experiments.

4. The rented land came into the hands of the Agricultural Department by the 23rd of June, which was rather late for preparation of the field. On account of heavy rain by the end of June the deep soil field had become inaccessible for several days. The preparatory tillage was complete by the 7th of August when the field was divided into two equal plots. One plot was planted according to the ordinary method (bed system), and the second according to the ridge system.

In the former system seed was dibbled 3′ apart in rows and in the latter, the field was put up into ridges 4′ apart and 5 seeds were dibbled on the side of the ridge one foot apart. Sowing was done on the 7th, 8th and 9th of August. In all three waterings were given to the plots. One in August, the second in October, and the third in January. Picking commenced on the 1st of April 1907 and was finished by the 24th of May.

In a similar manner, the light soil area was divided into two half-acre plots which were sown according to the bed and ridge systems. These plots were sown on the 24th and 25th of July 1906. They received five waterings, first on 31st July, second on 12th August, third on 15th September, fourth on 1st November, and the 5th on the 3rd of February. Picking was commenced at the end of March and ended by the 1st of May 1907.

The outturn results are tabulated below.

Survey No.	Area under experiment.	System.	Results per acre.			Number of canal waterings.	Remarks.
			Seed cotton.	Value of produce.	Cost of cultivation.		
	A. g.		Lbs.	Rs. a. p.	Rs. a. p.		
107	1 33½	Bed ...	251	28 13 0	...	8	Soil heavy; germination fair; heavy rains in August and September affected the plants considerably; several plants on ridges lodged, growth stunted; owing to cloudy weather bolls and flowers dropped in January; aphides appeared in the crop in February; by the end of the month plants appeared healthy, but many bolls dried when young.
,,	1 33½	Ridge ...	159	9 13 0	...	3	
126	0 20	Bed ...	808	50 8 0	61 14 8	5	Soil light; germination uneven; heavy rains caused the plants grown on ridges to lodge; bolls and flowers dropped in January; aphides appeared in February; on the whole the crop was healthy.
,,	0 20	Ridge ...	618	38 10 0	59 8 2	5	

N.B.—The cost of cultivation is rather high owing to the watching charges which were necessary on account of the isolated position of the fields.

On account of heavy rainfall, the sowing could not be undertaken in time in the heavy soil and the effect of late sowing has shown itself in the poor outturn. The over-saturation of the field from the adjoining sugarcane plot may have also affected the outturn.

In the light soil plot the sowing was also rather late, but the heavy rain does not appear to have affected the yield much, and in spite of aphides the crop yielded 618 lbs. of seed cotton in the ridge system and 808 lbs. in the bed system.

IV.—Irrigation Experiments with Sugarcane.

5. These experiments were divided into two blocks.

In the first block the sugarcane was planted on the 1st of February 1906; the experiment was commenced on the 27th of May, when the crop stood about 4′ high and had received about ten waterings. At this time the cane crop was almost even in growth in all the plots.

In this block the following was the scheme of experiments:—

Plot I—To receive water equal to 8″ of rainfall every 10 days.

,, II—To receive water equal to 4″ of rainfall every 10 days.

,, III—To receive water equal to 3″ of rainfall every 10 days.

,, IV—To receive water equal to 2½″ of rainfall at an interval of 6 days in the hot weather and 8 days in the cold weather.

The following table shows the results :—

No of plot.	Water equal to inches of rainfall.	Intervals between waterings. Days.	No. of waterings.	Results per acre.					Percentage of		
				Quantity of water in cubic feet.	Weight of canes topped.	Weight of tops.	Weight of juice.	Weight of Gul.	Juice to cane.	Gul to juice.	Gul to cane.
					Lbs.	Lbs.	Lbs.	Lbs.			
I ...	8″	10	28	813,120	104,947	15,152	80,405	13,704	76·6	17·2	13
II ..	4′	10	26	377,520	102,449	15,750	80,139	13,400	78·2	16·7	13
III ..	3″	10	24	261,360	97,482	17,557	78,055	12,733	80·0	16·3	13
IV ..	2½″	6 in hot weather and 8 in cold weather.	36	475,092	99,296	18,533	80,133	13,197	80·7	16·4	13

The results are inconclusive.

6. In the second block sugarcane was planted on the 1st of March 1906. At the time of the commencement of the experiment (27th May), the cane crop was 3′ to 3½′ high and had received about 8 waterings.

In this block the scheme of experiments was this :—

Plot I—To receive water equal to 1⅓″ of rainfall every 5th day.
„ II—To receive water equal to 2″ of rainfall every 7th „
„ III—To receive water equal to 2⅔″ of rainfall every 10th „
„ IV—To receive water equal to 4″ of rainfall every 15th „

The outturn results are tabulated below.

No. of plot.	Water equal to inches of rainfall.	Interval between waterings.	No. of waterings.	Results per acre.					Percentage of		
				Quantity of water in cubic feet.	Weight of canes. topped.	Weight of tops.	Weight of juice.	Weight of Gul.	Juice to cane.	Gul to juice.	Gul to cane.
					Lbs.	Lbs.	Lbs.	Lbs			
I ...	1⅓″	5	53	320 650	98,289	16,151	78,583	12,779	79·9	16·2	13·0
II ...	2″	7	39	283,140	98,086	13,464	79,475	13,397	81·0	16·8	13·6
III ...	2⅔″	10	23	251,680	101,699	16,077	86,112	14,776	84·0	17·1	14·5
IV ...	4″	15	18	261,360	95,033	16,307	79,635	13,402	83·0	16·8	14·1

From the above statement it will be seen that the plot receiving 2⅔″ of water every 10th day has produced a comparatively high outturn (14,776 lbs.). The crop in plot I was rather poor at the commencement of the experiments. The other plots II and IV have given yields above the average. The percentages of juice to cane and Gul to juice are comparatively high in all the plots.

V.—Manurial Experiments with Surgarcane.

7. The soil was medium red and had grown a crop of gram in the previous season. The field was divided into seven 10 guntha plots. The planting of cane was done between 25th and 27th of March 1906 and crushing was finished in June 1907.

The following was the scheme of experiments :—

Plot I.—Poudrette manure applied in two dressings.

„ II.—Farmyard manure before planting + Safflower cake as a top-dressing.

„ III.—Farmyard manure before planting + Nitrate of Potash as a top-dressing.

„ IV.—Farmyard manure before planting + fish as a top-dressing.

„ V.—Farmyard manure before planting + ashes + fish as a top-dressing.

„ VI.—Farmyard manure before planting + castor cake as a top-dressing.

„ VII.—The usual quantity of manure ordinarily applied by the cultivators. Farmyard manure, castor cake and fish manure were used.

The results are tabulated below :—

Plot No.	Manure per acre.				Results per acre.				Percentage of			Remarks.
	Kind.	Quantity	Nitrogen per acre.	Cost of manure.	Weight of canes.	Weight of tops.	Weight of juice.	Weight of Gul.	Juice to cane.	Gul to juice.	Gul to cane.	
		Lbs.	Lbs.	Rs. a. p.	Lbs.	Lbs.	Lbs.	Lbs.				
I ...	Poudrette in 2 dressings...	28,180	357	100 0 0	71,712	16,560	53,580	9,524	74·7	17·7	13·2	The crop was attacked by borers in the months of April and May.
II ...	Farmyard Manure ...	25,200	148	32 0 0	73,640	15,764	62,204	11,148	84·5	17·8	15·1	The following are the observations made at different times :—
	Safflower Cake ...	2,768	204	112 15 0								
III ...	Farmyard Manure ...	25,200	148	32 0 0	94,400	14,732	81,148	14,464	85·	17·8	15·3	16th April.—Germination was rather late in all the plots.
	Nitrate of Potash ...	1,556	202	172 12 0								1st September.—The appearance of the crop was green in plot No. 3. Plot 7 looking best of all the plots. This is due to the earlier earthing up.
IV ...	Farmyard Manure ...	25,200	148	32 0 0	54,872	9,180	45,828	7,468	83·5	16·3	13·6	9th September.—Cane crop showed improvement in colour.
	Fish Manure ...	7,216	202	240 0 0								22nd September.—Poudrette plot showed yellow colour, while all others were green.
V ...	Farmyard Manure ...	18,000	106	21 8 0	81,524	11,220	65,612	10,640	80·4	16·2	13·0	2nd November.—All plots were making good progress.
	Ashes ...	38,664	65	48 0 0								28th January.—The crop was looking pale in the poudrette plot. The crop in Nitre and other plots lodged.
	Fish Manure ...	6,584	194	219 7 4								
VI ...	Farmyard Manure ...	25,200	148	32 0 0	98,772	11,128	75,648	11,956	76·5	15·8	12·1	
	Castor Cake ...	3,968	206	124 0 0								
	Sheep dung ...	Not available.		5 0 0								
VII ...	Farmyard Manure ...	38,400	226	48 0 0	85,120	9,000	68,180	10,776	80·0	15·8	12·6	
	Castor Cake ...	5,760	298	180 0 0								
	Fish Manure ...	1,000	28	31 5 4								

From the above statement, it will be seen that the farmyard manure + nitrate of potash has given the highest outturn. Poudrette and farmyard manure + fish plots have comparatively produced low yields.

The plot No. 7 treated according to the cultivator's method of manuring has not given high yield when compared with the value of manure.

The results require verification after a further trial. Not more than about 500 lbs. of nitre should be applied per acre.

8. The demonstrations referred to in this report were planned by Mr. Knight.

Poona,
September 1907.

F. FLETCHER,
Acting Professor of Agriculture.

BOMBAY: PRINTED AT THE GOVERNMENT CENTRAL PRESS.

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ANNUAL REPORT

ON THE

EXPERIMENTAL WORK

OF THE

NADIAD AGRICULTURAL STATION

(Kaira District, Gujarát)

FOR THE YEAR

1906-1907

BY

F. FLETCHER, M.A., B.Sc., ETC.,
Deputy Director of Agriculture.

BOMBAY
PRINTED AT THE GOVERNMENT CENTRAL PRESS
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Vernacular names of crops, &c., mentioned in the report and their Botanical and English equivalents.

Botanical.	English.	Vernacular.
Oryza sativa ...	Rice ...	Dángar (Sutarsál, Kamod).
Pennisetum typhoideum ...	Bulrush millet ...	Bájri, Bájro.
Panicum scrobiculatum ...	Kodra millet ...	Kodra.
Hordeum vulgare	Barley ...	Jao.
Andropogon sorghum var. vulgare...	Great millet ...	Jowár.
Do. cernuum ...	Do. ...	Sundhia.
Eleusine coracana ...	Muma millet ..	Bávto.
Triticum vulgare ...	Wheat ...	Ghau.
Pulses.		
Cajanus indicus ...	Pigeon pea ...	Tuver.
Cicer arietinum ...	Gram ...	Chana.
Phaseolus mungo ...	Green gram ...	Mag.
Phaseolus radiatus ...	Black gram ...	Adad.
Dolichos lablab ...	Indian bean ...	Vál.
Cyamopsis psoralioides ...	Field vetch ...	Guvár.
Glycine hispida ...	Soy beans.	
Oil-seeds.		
Sesamum indicus ...	Sesamum ...	Tal.
Ricinus communis ...	Castors ...	Diveli.
Arachis hypogea ...	Groundnut ...	Bhoising.
Eruca sativa ...	....	Jámbho.
Fibre Plants.		
Gossypium herbaceum ...	Gujarát and Dhárwár cotton .	Broach, Ghogári, Kumta, &c., kapás.
Do. neglectum ...	Do. ...	Rozi kapás.
Hibiscus cannabinus ...	Brown hemp ...	Sheria, Ambádi.
Crotolaria juncea ...	Bombay hemp ...	San.
Condiments.		
Cuminum cyminum ...	Cumine ...	Jiru.
Capsicum frutescens ...	Chillies ...	Marcha.
Pimpinella anisum ...	Anise ...	Variáli.
Allium cepa ...	Onions ...	Kánda.
Brassica juncea ...	Mustard ..	Rái.
Sugar.		
Sachharum officinarum ...	Sugarcane ...	Sherdi.
Narcotics.		
Nicotiana tabacum ...	Tobacco ...	Tambákhu.
Vegetables.		
Solanum melongena ..	Brinjal ..	Vengan.
Solanum tuberosum ...	Potato ...	Batáta.
Momordica charantia ...	Bitter gourd ...	Káreli.

One guntla = $\frac{1}{40}$ of an acre.

THE NADIA'D AGRICULTURAL STATION, 1906-07.

Established—1903; *North Latitude*—22° 44′; *East Longitude*—73° 0′; *Elevation*—approximately sea level; *Soil*—alluvial loam (Var. Gorádu); *Average rainfall*—34′ 61″; *Temperature*—maximum 114° in May, minimum 43° in January.

Area—44 acres.

Superintendent—Mr. Dattátraya Hari Tagáre.

Season.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
Rainfall—	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
(1906-07)	0 0	0 0	6 35	11 15	12 25	0 12	0 0	0 0	0 0	0 0	0 75	0 2	30 67
Average	0 1	0 15	4 49	14 8	9 64	5 16	0 44	0 37	0 5	0 3	0 16	0 6	34 61
Temperature (1906-07)—													
Mean maximum ...	105°	103°	97°	93°	91°	89°	96°	94°	90°	88°	88°	98°	
Mean minimum ...	74°	83°	83°	81°	79°	78°	72°	63°	56°	51°	55°	64°	

2. The monsoon commenced early. The first shower of rain came on the 16th June and by the 29th June there was sufficient rain to sow all crops. Since the famine this was the first year in which sowing could be commenced in June. The rain was quite favourable for germination. During the first fortnight of July, there was slight rain and cultivators were very anxious to have heavy rains for transplanting rice. Seedlings of rice were rather overgrown as they could not be planted till 25th of July. Heavy rainfall on the 24th and 25th of July damaged the young cotton plants to some extent. There was only an inch of rain during the first fortnight of August. Bájri, Tal, Tuver, etc., crops grew vigorously. Bájri grew very vigorously and promised a good yield. About the middle of August, Kodra plants began to wither in some places. On the 26th August there was a heavy rainfall and the fine crop of Bájri was badly laid. The flowers were washed off and the subsequent constant rain for a week caused the ears to rot. This season there was Bájri smut very prevalent in the district and naturally the farm suffered along with the rest, with the result that the Bájri crop was a total failure. Some of the cultivators did not even take the trouble to harvest the crop as it consisted of nothing but inferior Bájri straw.

Owing to the favourable time of transplanting even the small seedlings of tobacco were planted; but on account of constant rain, they rotted and there were several blanks in the fields. The scarcity of seedlings was much felt this year and many a cultivator made a profitable business in selling extra seedlings. Kodra, barley, rice, etc., were much benefited by this rain. In the month of September there were only 3·65 inches of rain. On the whole it may be said that the season was a favourable one for crops in general when compared with the past few years.

Manurial Experiments.

3. *Irrigated Tobacco.*—The object was—

(1) to compare the effects of the following manures:

(*a*) Farmyard manure,

(*b*) Castor-cake,

(*c*) Farmyard manure + castor-cake,

(*d*) Farmyard manure + nitre,

(*e*) Farmyard manure + sodium nitrate,

(*f*) Farmyard manure + ammonium sulphate,

(*g*) San ploughed in as green manure;

(2) to compare tobacco grown in rotation with tobacco grown continuously;

(3) to compare the effects of ordinary and deep ploughing on tobacco.

By deep ploughing is meant ploughing with an English Turnwrest plough followed by a country wooden plough in the same furrow.

The following table shows the details of cultivation of the several tobacco plots:—

Plot No.	Area.	Crop.	Tillage.	Manure.			Continuous or in rotation.	Crops grown in rotation.	Irrigated or not.	Results per acre.			Remarks.
				Kind.	Quantity per acre.	Date of application of manure.				Outturn of cured leaves.	Value of produce.	Cost of cultivation.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Gunthas.									Lbs.	Rs. a. p.	Rs. a. p.	
1	10	Tobacco .	Ordinary ...	Farmyard manure .	15 tons ...	June ...	Continuous...	.....	Irrigated.	1,780	142 6 4	80 13 0	
12	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	.....	Do. ...	1,760	140 12 8	85 11 0	
2	10	Do. ...	Ordinary ...	Castor-cake ...	2,000 lbs. ...	October ...	Do. ...	.....	Do. ...	1,504	120 5 0	92 11 4	Damaged by wilt.
3	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	.....	Do. ...	1,423	114 2 0	92 4 0	Do.
3	10	Do. ...	Ordinary	Farmyard manure . + Castor-cake ...	10 tons ... + 600 lbs. ...	June ... October ...	Do. ...	.....	Do. ...	1,992	159 5 8	81 6 0	
14	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ..	Do. ...	.....	Do. ...	1,984	159 3 4	84 6 4	
4	10	Do. ...	Ordinary	Farmyard manure . + Nitre ...	10 tons ... 112 lbs. ...	June ... October ...	Do. ...	.....	Do. ...	1,240	99 3 0	81 9 4	Damaged by wilt.
15	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	.....	Do. ...	1,564	125 2 0	84 13 8	Do.
5	10	Do. ...	Ordinary	Farmyard manure . + Sodium nitrate ...	10 tons ... 112 lbs. ...	June ... October ...	Do. ...	.....	Do. ...	1,224	97 14 8	82 3 8	Do.
16	10	Do. ...	Deep ..	Do. ...	Do. ...	Do. ...	Do. ...	.....	Do. ...	1,608	128 10 0	84 15 8	
23	10	Do. ...	Ordinary ...	Green manure of San.	San was sown in July and ploughed in August.		Do. ...	.....	Do. ...	1,824	145 14 8	60 11 8	
34	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	.....	Do. ..	2,172	173 12 0	64 6 8	
25	10	Do. ...	Ordinary ...	Do. ...	Do. ...	Do. ...	In rotation.	1st year tobacco... 2nd year Kodra...	Do. ...	2,092	167 5 8	59 5 0	
36	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	1,948	155 13 4	66 11 0	
27	10	Do. ...	Ordinary ...	Farmyard manure .	15 tons ...	June ...	Do. ...	Do. ...	Do. ...	1,512	120 15 4	84 1 8	Damaged by wilt.
38	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	1,780	158 6 4	85 10 8	
141	12	Do. ...	Ordinary	Farmyard manure . + Ammonium sulphate.	10 tons ... 112 lbs. ...	June ... October ...	Continuous.	.....	Do. ...	1,490	119 3 2	77 14 10	Damaged by wilt.

Owing to the saltish irrigation water the cured leaves were not bright in colour. The nitre and sodium nitrate plots were severely damaged by wilt disease. Green manure (San) has produced a better yield. The cured leaves are thinner and rather whitish in appearance. This green manure makes the soil very soft and is likely to encourage the growth of Vacumba (Orobanche Nicotiana). No conclusions can be drawn as some of the plots are damaged by wilt disease.

4. *Rice.*—The object was—

(1) to compare farmyard manure with nitre,

(2) to compare rice manured and irrigated with rice manured but not irrigated,

(3) to compare rice grown unmanured and unirrigated with rice grown manured but not irrigated.

The variety of rice grown was Sutarsál.

The results are as under :—

Plot No.	Area.	Crop.	Tillage.	Manure.			Irrigation.	Yield per acre.		Value of produce.	Cost of cultivation.
				Kind.	Quantity per acre.	Time of application.		Grain.	Straw.		
	Gunthas.							Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
90	6	Rice ...	Ordinary	F. Y. M. ... + Nitre ...	7½ tons... 80 lbs. ...	June ... August...	Nil ...	1,266	2,046	46 6 2	57 8 6
91	6	Do. ...	Do. ...	Nil ...	Nil ...	...	Nil ...	1,200	2,146	44 10 5	36 4 0
93	5·8	Do. ...	Do. ...	F. Y. M. ...	7½ tons...	June ...	Nil ...	1,127	2,051	42 0 8	50 10 11
94	6	Do. ...	Do.	F. Y. M. ... + Nitre ...	7½ tons... 80 lbs. ...	June ... August...	Irrigated.	1,983	2,418	68 7 6	64 6 0
95	8·5	Do. ...	Do.	F. Y. M. ...	7½ tons...	June ...	Do. ...	1,529	1,915	54 1 4	58 8 6

The crops are all below the average; owing to the sandy nature of the soil these rice beds cannot at present hold sufficient moisture. Nitre has apparently produced a considerable increase in the irrigated rice. On the irrigated plots the addition of nitre (worth Rs. 8) to farmyard manure increased the value of the crop by some Rs. 14.

Rotation Series Experiments.

5. *Series I.*—The object was to see the effects of ordinary and deep ploughing on the following rotation and to compare it with others :—

1st year— { (*a*) Bájri. (*b*) Jiru and Káreli.

2nd year—Sundhia.

3rd year—Kodra and mixture.

The following statement shows the details of plots and cultivation in this series :—

Plot No.	Area.	Crop.	Tillage.	Manure. Kind.	Manure. Quantity per acre.	Manure. Time of application.	In rotation or continuous.	Irrigated or not.
	Gundhas							
8	10	(a) Bájri ... (b) Jiru ... + Kárell ...	.....	Nil ...	Nil ...	...	In rotation ...	Nil.
			Ordinary ...	F. Y. M.	10 tons ...	November	.....	Irrigated.
19	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	In rotation ...	Do.
6	10	Sundhia ...	Ordinary ...	Nil ...	Nil ...	...	Do. ...	Nil.
17	10	Do. ...	Deep ...	Nil ...	Nil ...	...	Do. ...	Nil.
7	10	Kodra and mixture.	Ordinary ...	Nil ...	Nil ...	...	Do. ...	Nil.
18	10	Do. ...	Deep ...	Nil ...	Nil ...	...	Do. ...	Nil.

The results of Bájri and Jiru are as under :—

Crop.	Plot No. 8 ordinarily ploughed. Yield per acre. Grain.	Plot No. 8 ordinarily ploughed. Yield per acre. Straw.	Plot No. 8 ordinarily ploughed. Value of produce.	Plot No. 8 ordinarily ploughed. Cost of cultivation.	Plot No. 19 deeply ploughed. Yield per acre. Grain.	Plot No. 19 deeply ploughed. Yield per acre. Straw.	Plot No. 19 deeply ploughed. Value of produce.	Plot No. 19 deeply ploughed. Cost of cultivation.
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	540	4,536	22 15 4	19 13 8	624	4,860	29 1 4	22 5 8
Jiru	476	...	54 9 4	58 13 8	588	...	67 6 8	63 1 8
+ Kárell			Not finished.					

The yield of Bájri is below the average owing to heavy rains at the end of August.

The Jiru was a promising crop but was damaged seriously by rain in February. The quality of the produce was inferior.

The results of Sundhia are as under :—

Crop.	Plot No. 6 ordinarily ploughed. Yield per acre. Grain	Plot No. 6 ordinarily ploughed. Yield per acre. Straw.	Plot No. 6 ordinarily ploughed. Value of produce.	Plot No. 6 ordinarily ploughed. Cost of cultivation.	Plot No. 17 deeply ploughed. Yield per acre Grain.	Plot No. 17 deeply ploughed. Yield per acre Straw.	Plot No. 17 deeply ploughed. Value of produce.	Plot No. 17 deeply ploughed. Cost of cultivation.
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Sundhia	128	5,172	25 6 0	19 9 4	212	5,780	31 4 8	23 9 0

The results of the Kodra mixture are as under :—

Crop.	Plot No. 7 ordinarily ploughed.				Plot No. 18 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Kodra	252	548	4 15 4	17 8 0	188	548	3 12 4	20 0 0
Tal	308	... Fibre	26 0 0		372	... Fibre	31 6 0	
Sheria	148	80	7 7 4		96	44	4 7 0	
Tuver	556	668	20 7 0		416	500	15 4 8	
			58 13 8				54 14 0	

The crop of Tal was very good.

6. *Series II.*—The object was to see the effects of ordinary and deep ploughing on the following rotation and to compare it with others :—

1st year ... ... Bájri, Math and Tuver.
2nd year ... ... Kodra and mixture.
3rd year ... ... Sundhia.

The following statement shows the details of plots and cultivation under this series :—

Plot No.	Area.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantity per acre.	Time of application.		
	Gunthas.							
11	10	Bájri, Math and Tuver.	Ordinary ...	F. Y. M. ...	5 tons ...	June ...	In rotation.	Nil.
22	10	Do. ...	Deep ..	Do. ...	Do. ...	Do. ...	Do. ...	Nil.
9	10	Kodra and mixture.	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
20	10	Do. ...	Deep ...	Nil ...	Nil ...	.....	Do. ...	Nil.
10	10	Sundhia ...	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
21	10	Do. ...	Deep ...	Nil ...	Nil ..	.....	Do. ...	Nil.

The results of Bájri, Math and Tuver are as under :—

Crop.	Plot No. 11 ordinarily ploughed.				Plot No. 22 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	228	2,284	12 3 4	32 1 4	272	2,272	13 11 0	34 9 4
Math	212	1,696	8 11 0		180	1,264	7 0 4	
Tuver	308	344	11 4 4		408	364	13 5 0	
			32 2 8				34 0 4	

The yield of Bájri is much below the average. There is not much difference between ordinarily ploughed and deeply ploughed plots.

The results of Sundhia are as under :—

Crop.	Plot No. 10 ordinarily ploughed.				Plot No. 21 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Sundhia	388	4,452	32 14 0	21 8 0	412	4,432	33 6 4	24 4 8

The results of Kodra are as under :—

Crop.	Plot No. 9 ordinarily ploughed.				Plot No 20 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Kodra	482	368	8 6 8	19 6 8	528	1,100	10 4 4	21 14 8
Tal	56	...	4 11 8		120	...	10 2 0	
		Fibre				Fibre		
Sheria	132	72	6 11 0		140	76	7 1 4	
Tuver	432	400	15 12 4		312	352	11 7 0	
			35 9 8				38 14 8	

There is no difference between the two plots; the value of produce is similar.

7. *Series III.*—The object was to see the effects of deep and ordinary ploughing on the following rotation and to compare it with others :—

(*a*) 1st year ... ... Tobacco manured with farmyard manure.
2nd year ... ... Kodra mixture.

(*b*) 1st year ... ... Tobacco manured with green manure.
2nd year ... ... Kodra mixture.

The details of plots and cultivation in the series are as under :—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantity per acre.	Time of application.		
25	10	Tobacco ...	Ordinary ...	Green	manure (of	San) ...	In rotation.	Irrigated
36	10	Do. ...	Deep ...		Do.		Do. ..	Do.
24	10	Kodra mixture	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
35	10	Do. ...	Deep ...	Nil ...	Nil ..	.....	Do. ...	Nil.
27	10	Tobacco ...	Ordinary ...	F. Y. M. ...	15 tons ...	June ...	Do ...	Irrigated.
38	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ..	Do. ...	Do.
26	10	Kodra mixture.	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
37	10	Do. ...	Deep ...	Nil ...	Nil ...	.....	Do. ...	Nil.

The results of tobacco have already been noted (page 3).

The results of Kodra grown in rotation with tobacco manured with green manure are as under :—

Crop.	Plot No. 24 ordinarily ploughed.				Plot No. 25 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Kodra	1,416	3,156	27 8 8	20 6 0	1,304	2,944	25 11 2	22 14 0
Tal	60	...	5 1 0		112	...	9 7 4	
Sheria	268	Fibre 160	14 4 4		152	Fibre 84	7 12 0	
Tuver	324	300	11 13 4		432	492	16 13 4	
			58 11 4				58 11 10	

Yield of both the plots is similar.

The results of Kodra grown in rotation with tobacco manured with farmyard manure are as under :—

Crop.	Plot No. 26 ordinarily ploughed.				Plot No. 37 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Kodra	1,208	3,372	24 6 4	20 12 0	1,272	3,512	23 9 7	23 4 0
Tal	228	...	19 4 0		208	...	17 8 8	
Sheria	248	Fibre 120	11 13 0		9	Fibre 44	4 7 0	
Tuver	752	940	27 12 0		600	688	22 4 0	
			83 3 4				70 13 3	

If the above four plots be compared, it seems that Kodra after a crop manured with farmyard manure grows better than after a crop manured with green manure.

8. *Series IV.*—The object was to see the effects of deep and ordinary ploughing on the following rotation and compare it with others :—

1st year	Variáli.
2nd year	(*a*) Bájri.
	(*b*) Onions.
3rd year	Kodra and mixture.

The following table gives the details of plots and cultivation in this series :—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure. Kind.	Manure. Quantity per acre.	Manure. Time of application.	In rotation or continuous.	Irrigated or not.
30	10	Variáli ...	Ordinary ...	F. Y. M. ...	12½ tons	June ...	In rotation.	Irrigated.
41	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
28	10	(a) Bájri ...	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
		(b) Onions ...	Do. ...	Castor-cake.	800 lbs. ...	January ...	Do. ...	Irrigated.
39	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
29	10	Kodra mixture	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
40	10	Do. ...	Deep ...	Nil ...	Nil ...	.....	Do. ...	Nil.

The results of Variáli are as under :—

Crop.	Plot No. 30 ordinarily ploughed. Yield per acre. Grain.	Straw.	Value of produce.	Cost of cultivation.	Plot No. 41 deeply ploughed. Yield per acre. Grain.	Straw.	Value of produce.	Cost of cultivation.
	Lbs.		Rs. a. p.	Rs. a. p.	Lbs.		Rs. a. p	Rs. a. p.
Variáli	1,744	...	140 5 8	101 8 8	2,194	...	176 9 4	104 0 8

The results of Bájri and onions are as under :—

Crop.	Plot No. 8 ordinarily ploughed. Yield per acre. Grain.	Fodder.	Value of produce.	Cost of cultivation.	Plot No. 39 deeply ploughed. Yield per acre. Grain.	Fodder.	Value of produce.	Cost of cultivation.
	Lbs	Lbs.	Rs. a. p	Rs. a. p	Lbs.	Lbs.	Rs. a. p	Rs. a. p.
A. Bájri	576	6,192	29 5 8	20 13 0	634	5,792	24 0 0	23 5 0
B. Onions	19,200	...	210 10 4	112 4 4	19,[illegible]70	...	2[illegible]1 13 8	117 4 4

Bájri was a very promising crop but was damaged by late rains. Both the plots of onions are similar in yield.

The results of Kodra are as under :—

Crop.	Plot No. 29 ordinarily ploughed. Yield per acre. Grain.	Fodder.	Value of produce.	Cost of cultivation.	Plot No. 40 deeply ploughed. Yield per acre. Grain.	Fodder	Value of produce.	Cost of cultivation.
	Lbs.	Lbs.	Rs. a. p	Rs. a. p	Lbs	Lbs.	Rs. a. p.	Rs. a. p.
Kodra	460	952	9 0 0	18 4 0	436	948	8 15 0	20 12 0
Tal	288	...	24 4 8		244	...	20 9 4	
		Fibre				Fibre		
Sheria	128	68	6 6 4		144	68	6 12 4	
Tuver	612	702	22 10 8		552	628	20 1 8	
			62 5 8				56 6 4	

9. *Series V.*—The object was to see the effects of deep and ordinary ploughing on the following rotation and to compare it with others :—

1st year	...	...	Bájri and mixture.
2nd year	...	...	Kodra and mixture.
3rd year	...	...	Bávto, Vál and castors.

The following table shows the details of plots and cultivation in this series :—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind	Quantities per acre.	Time of application.		
33	10	Bájri and mixture .	Ordinary ...	F. Y. M.	5 tons ...	June ...	In rotation ...	*Nil.*
44	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	*Nil.*
31	10	Kodra and mixture.	Ordinary ...	*Nil* ...	*Nil* ...	...	Do. ...	*Nil.*
42	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	...	Do. ...	*Nil.*
32	10	Bávto, castors and Vál.	Ordinary ...	*Nil* ...	*Nil* ...	...	Do. ...	*Nil.*
43	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	...	Do. ...	*Nil.*

The results of Bájri mixture are as under :—

Crop.	Plot No. 32 ordinarily ploughed.				Plot No. 43 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	304	2,532	15 10 0	36 6 8	343	2,680	17 8 4	38 12 8
Math	44	296	1 11 0		40	238	1 9 4	
Mag	360	2,588	16 6 8		280	1,816	12 6 0	
Tuver	308	428	11 7 0		184	216	6 12 8	
			45 2 8				38 4 4	

The results of Kodra mixture are as under :—

Crop.	Plot No. 31 ordinarily ploughed.				Plot No. 42 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Kodra	1,128	2,084	22 2 4	18 12 0	1,076	2,040	21 2 8	21 4 0
Tal	48	...	4 0 8		244	...	20 9 4	
		Fibre				Fibre		
Sheria	196	84	8 12 4		276	100	11 7 4	
Tuver	232	260	8 7 8		272	300	10 15 4	
			43 7 0				63 2 8	

The results of Bávto, castors and Vál are as under:—

Crop.	Plot No. 33 ordinarily ploughed.				Plot No. 43 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bávto	1,580	2,843	52 15 0	31 14 8	1,331	2,556	47 5 4	34 6 8
Castors	292	...	18 4 0		268	...	16 12 0	
Vál green pods ...	768	...	10 10 0		712	...	9 14 0	
Do. Grain ...	104	...	3 4 0		84	...	2 10 0	
			86 1 0				76 9 4	

10. *Series VI.*—The object was to see the effects of ordinary and deep ploughing on the following rotation and to compare it with others:—

1st year ... ... Sugarcane.
2nd year ... ... Chillies.
3rd year ... ... Bájri.

The following statement shows the details of plots, crops, cultivation, etc., in this series:—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantities per acre.	Time of application.		
45A	5	Sugarcane.	Ordinary ...	Castor-cake..	8,000 lbs.	May-July ...	In rotation ...	Irrigated.
53A	5	Do. ..	Deep ...	Do. ..	Do. ..	Do. ...	Do. ..	Do.
45B	5	Do. ..	Ordinary.	Castor-cake + Ammonium sulphate.	,000 lbs. 400 lbs.	Do. ...	Do. ...	Do.
53B	5	Do. ..	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
46A	5	Do. ...	Ordinary	Castor-cake... + Nitre ..	8,000 lbs. 400 lbs.	Do. ...	Do. ...	Do.
54A	5	Do. ..	Deep ...	Do. ..	Do. ...	Do. ...	Do. ...	Do.
46B	5	Do. ...	Ordinary	Castor-cake.. + Nitre .. + Ammonium sulphate.	4,000 lbs 200 lbs. 200 lb.	Do. ...	Do. ...	Do.
54B	5	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
49	10	Chillies ..	Ordinary...	Castor-cake..	3,000 lb.	Do. ...	Do. ...	Do.
57	10	Do. ..	Deep ...	Do ..	Do. ...	Do. ...	Do. ...	Do.
50	10	Do. ..	Ordinary.	Castor-cake + Superphosphate.	2,000 lbs. 500 lbs.	Do. ...	Do. ...	Do.
58	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
47	10	Bájri ...	Ordinary ...	*Nil* ...	*Nil* ...	.....	Do. ...	Do.
55	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	.....	Do. ...	Do.
48	10	Do. ...	Ordinary ...	*Nil* ...	*Nil* ...	.....	Do. ...	Do.
56	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	.....	Do. ...	Do.

Sugarcane was planted in May but on account of white ants, germination was very poor. It was also attacked by borers afterwards and the crop was ploughed up.

Results of Bájri are as under:—

Crop.	Plot Nos. 47-48 ordinarily ploughed.				Plot Nos. 55-56 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	544	5,503	29 4 2	19 12 4	578	5,972	30 0 10	22 4 4

The crop was damaged by late rains.

The results of chillies are as under:—

Plot No.	Crop.	Tillage.	Manure.	Yield per acre.	Value of produce.	Cost of cultivation.	Remarks.
				Lbs.	Rs. a. p.	Rs. a. p.	
49	Chillies ...	Ordinary ...	Castor-cake ..	752	15 10 8	119 11 0	Totally damaged by white ants.
57	Do. ..	Deep ...	Do. ...	2,636	54 14 8	138 13 4	
50	Do. ...	Ordinary ...	Superphosphate + castor-cake.	1,786	37 3 4	132 14 4	
58	Do. ...	Deep ...	Do. ...	5,138	107 0 8	150 15 4	

The results are very poor.

11. *Series VII.*—The object was to see the effects of deep and ordinary ploughing on the following rotations and to compare it with others:—

1st year ... ... (*a*) Bájri.
(*b*) Wheat.

2nd year ... ... Kodra and mixture

The details of plots, crops, cultivation, etc., are as under:—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantity per acre.	Time of application.		
52	10	Kodra mixture.	Ordinary ...	*Nil* ...	*Nil* ...	.....	In rotation...	*Nil.*
60	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	.....	Do. ...	*Nil.*
51	10	(*a*) Bájri ... (*b*) Wheat ...	Ordinary ..	F. Y. M.. *Nil* ...	10 tons ... *Nil* ...	June ...	Do. ...	*Nil.* Irrigated.
59	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	June ...	Do. ...	Do.

The results of Kodra mixture are as under :—

Crop.	Plot No. 52 ordinarily ploughed.				Plot No. 60 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs a. p.	Lbs.	Lbs.	Rs a. p.	Rs. a. p.
Kodra	508	1,188	10 0 4	18 13 0	924	2,036	18 10 4	21 5 0
Til	84	... Fibre	7 1 4		60	... Fibre	5 1 0	
Sheria	156	56	6 7 0		116	56	5 8 0	
Tuver	560	680	20 9 4		464	628	16 8 0	
			44 2 0				45 11 4	

The results of Bájri and wheat are as under :—

Crop.	Plot No. 51 ordinarily ploughed.				Plot No. 59 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
A. Bájri ...	748	5,408	34 8 0	42 6 4	576	5,408	29 12 0	44 13 0
B. Wheat ...	983	1,964	35 15 4	60 0 0	1,628	2,356	60 7 4	69 14 0

The yield is below the average.

12. *Series VIII.*—The object was—

(1) to compare the effects of farmyard manure + castor-cake + green manures ;

(2) to compare the effects of deep ploughing ;

(3) to compare the effects of taking 3 crops in a year with those of taking the same crops in 2 years.

The details of plots, crops and treatment are as under :—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manures.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantity per acre.	Time of application.		
61	10	Bájri ...	Ordinary ...	F. Y. M. ...	10 tons...	June ...	Continuous ...	*Nil.*
		Potatoes ...	Do. ...	Castor-cake...	800 lbs. .	December ...	Do. ...	Irrigated.
		Sundhia ...	Do. ...	*Nil* ...	*Nil* ...	*Nil* ...	Do. ...	Do.
71	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
62	10	Potatoes ...	Ordinary ...	San ...	Green	manure ... August ..	In rotation ...	Do.
		Sundhia ...	Do. ...	*Nil* ...	*Nil* ..	*Nil* ...		
72	10	Do. ..	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
64	10	Potatoes ...	Ordinary ...	Castor-cake .	800 lbs. .	December ...	In rotation ...	Do.
		Sundhia ...	Do. ...	*Nil* ...	*Nil* ...	*Nil* ...		
74	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Do.
63	10	Bájri ...	Ordinary ...	*Nil* ...	*Nil* ...	.....	1st year Bájri. 2nd year Potatoes with green manure.	*Nil.*
73	10	Do. ...	Deep ...	*Nil* ...	*Nil* .	.....		*Nil.*
65	10	Do. ...	Ordinary ...	*Nil* ...	*Nil* ...	.....	1st year Bájri, 2nd year Potatoes with castor-cake.	*Nil.*
75	10	Do. ...	Deep ...	*Nil* ...	*Nil* ...	.....		*Nil.*

The results of Bájri, potatoes and Sundhia grown in one year are as under :—

Crop.	Plot No. 61 ordinarily ploughed.				Plot No. 71 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
A. Bájri	690	5,028	31 11 8	78 11 8	796	5,463	35 10 0	41 3 8
B. Potatoes	4,080	...	55 15 4	137 14 4	4,930	...	68 0 0	144 7 4
C. Sundhia	...	6,068	30 5 4	29 12 0	...	5,516	37 9 4	34 12 0

The results of potatoes and Sundhia grown in rotation with the above plot are as under :—

Crop.	Plot No. 62 ordinarily ploughed.				Plot No. 72 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
A. Potatoes	7,520	...	103 2 0	133 10 8	8,400	...	115 3 0	138 0 8
B. Sundhia	...	4,616	23 1 4	31 2 0	...	6,724	33 10 0	36 10 0

The results of potatoes and Sundhia grown in rotation with the above plot are as under :—

Crop.	Plot No. 64 ordinarily ploughed.				Plot No. 74 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
A. Potatoes	6,180	...	84 12 0	140 0 0	6,860	...	94 1 4	144 1 0
B. Sundhia	...	1,924	45 10 0	32 12 0	...	8,248	41 4 0	39 0 0

The results of Bájri grown in rotation with potatoes manured with green manure are as under :—

Crop.	Plot No. 63 ordinarily ploughed.				Plot No. 73 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	688	5,428	34 4 8	27 14 4	624	6,316	33 6 8	30 6 4

The results of Bájri grown in rotation with potatoes manured with castor-cake are as under :—

Crop.	Plot No. 65 ordinarily ploughed.				Plot No. 75 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	672	5,980	33 9 0	47 13 0	552	6,012	29 14 4	50 7 8

Bájri in all plots is below the average owing to the damage done by the late rains. Potato cultivation was costly owing to the high price of seed potatoes. The seed was purchased at Rs. 2-8-0 per maund and the produce was sold at As. 10 per maund. This is due to the variation in the market. The plot manured with green manure and deeply ploughed has alone given an average outturn. Salt water of the well seems to have had some effect on the potatoes. From the Jowár plots it seems that the green manure leaves less manurial residue for the next crop than farmyard manure.

13. *Series IX.*—The object was to compare the effects of deep and ordinary ploughing on the following crops and rotations and to compare Rozi cotton with Broach cotton :—

(*a*) 1st year ... ... Kodra and mixture.
2nd „ ... ... Bájri mixture.
3rd „ ... ... Broach cotton.
(*b*) 1st year ... ... Kodra mixture and Rozi cotton.
2nd „ ... ... Bájri do.

The details of plots, crops, cultivation, etc., are noted below :—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantity per acre.	Time of application.		
63	10	Kodra mixture.	Ordinary ..	Nil ...	Nil ...	.....	In rotation.	Nil.
78	10	Do. ...	Deep ...	Nil ...	Nil ...	.....	Do. ...	Nil.
66	10	Bájri and mixture.	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
76	10	Do. ...	Deep ...	Nil ...	Nil ...	.....	Do. ...	Nil.
67	10	Cotton ...	Ordinary ...	F. Y. M....	5 tons ...	June ...	Do. ...	Nil.
77	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Nil.
70	10	Kodra mixture and Rozi cotton.	Ordinary ...	Nil ...	Nil ...	.....	Do. ...	Nil.
80	10	Do. ...	Deep ...	Nil ...	Nil ...	.....	Do. ...	Nil.
69	10	Bájri mixture and Rozi cotton.	Ordinary ...	F. Y. M....	5 tons ...	June ...	Do. ...	Nil.
79	10	Do. ...	Deep ...	Do. ...	Do. ...	Do. ...	Do. ...	Nil.

Results of Kodra mixture are as under :—

Crop.	Plot No. 68 ordinarily ploughed.				Plot No. 78 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Folder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs a. p.	Rs. a. p.
Kodra	2,080	4,440	41 4 0	18 4 8	1,520	3,080	30 0 0	20 12 8
Tal	40	...	3 6 0		44	...	3 11 4	
		Fibre				Fibre		
Sheria	300	168	15 6 8		148	84	7 10 4	
Tuver	624	723	22 14 4		828	941	30 5 8	
			82 11 0				71 11 4	

Kodra mixture was a very good crop.

The results of Bájri mixture are as under :—

Crop.	Plot No. 66 ordinarily ploughed.				Plot No. 76 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	584	5,280	7 9 0	31 15 4	480	5,056	26 5 0	34 7 4
Math	48	308	1 12 9		44	288	1 11 0	
Mug	208	1,148	8 12 8		160	493	6 12 4	
Tuver		Nil				Nil		
			40 13 4				34 12 4	

Bájri crop is below the average. Tuver plants were totally smothered when the Bájri plants were laid down by rain. Math and Mag also suffered.

The results of Broach cotton are as under :—

Crop.	Plot No. 67 ordinarily ploughed.			Plot No. 77 deeply ploughed.		
	Yield per acre.	Value of produce.	Cost of cultivation	Yield per acre.	Value of produce.	Cost of cultivation.
	Seed cotton.			Seed cotton.		
	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Rs. a. p.	Rs. a. p.
Broach cotton	828	67 4 4	30 14 8	990	80 7 0	33 6 8

On these plots cotton was not attacked with wilt disease. The outturns were very good. The deep ploughed plot has given the better yield.

The results of Kodra mixture with Rozi cotton are as under :—

Crop.	Plot No. 70 ordinarily ploughed.				Plot No. 80 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Fodder.			Grain.	Fodder.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p	Lbs.	Lbs.	Rs a p.	Rs a. p.
Kodra	864	1,748	17 3 0		83[illegible]	592	17 8 0	
Tal	52	...	4 6 0		36	...	3 0 8	
		Fibre				Fibre		
Sheria	140	84	7 7 4	17 8 8	134	10[illegible]	9 5 0	2[illegible] 0 8
Tuver	608	724	22 5 4		400	43[illegible]	14 11 8	
	Seed cotton				Seed cotton			
Rozi cotton	42	...	2 10 0		26	...	1 10 0	
			53 15 8				43 3 4	

The results of Bájri mixture are as under :—

Crop.	Plot No. 69 ordinarily ploughed.				Plot No. 79 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain	Straw.		
	Lbs.	Lbs.	Rs. a. p	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	572	4,316	28 2 4		474	3,968	23 13 0	
Math	24	152	0 14 4		1[illegible]	96	0 9 4	
Mag	2[illegible]0	1,264	9 6 4	37 8 4	32[illegible]	1,714	13 11 0	40 0 4
Tuver	28[illegible]	440	14 3 4		1[illegible]6	216	7 2 8	
	Seed cotton				Seed cotton			
Rozi cotton	15	...	0 15 0		16	...	1 0 0	
			53 9 4	37 8 4			46 4 0	40 0 4

14. *Series X.*—The object was to find out which of the following crops, *viz.* Tal, Tuver and Tal and Tuver mixed, leaves a better residue for the next crop. Tal + Tuver and Tal Tuver were sown last year. Bájri was sown on all these plots this year.

The following are the details :—

No. of plot.	Area in gunthas.	Tillage.	Last year's crop.	This year's crop.	Yield per acre.		Value of produce.	Cost of cultivation.
					Grain	Straw.		
					Lbs.	Lbs.	Rs. a. p.	Rs a. p.
83	10	Ordinary ...	Tal ...	Bájri ...	636	6 220	33 2 0	23 2 4
84	10	Do. ...	Tuver ...	Do. ...	572	5,408	23 10 8	22 14 4
85 & 86	20	Do. ..	Tal + Tuver ...	Do. ...	546	4,62[illegible]	23 3 10	19 5 10

The yield of all the plots is below the average. The plot of Tal has produced a better yield than either Tuver or Tuver + Tal together.

15. *Series XI.*—The object was to investigate the theory of rotations. Tobacco and Bájri are the crops experimented with. All the plots mentioned below are to receive 20 loads of farmyard manure every second year. This will always be applied to tobacco when this crop is grown on the plot. The following are the details :—

Plot.	Area in gunthas.	Crop.	Tillage.	Manure.			In rotation or continuous.	Irrigated or not.
				Kind.	Quantity per acre.	Time of application		
108	10	Tobacco ...	Ordinary ...	F. Y. M....	10 tons ...	June ...	In rotation.	Nil.
109	10	Bájri ...	Do. ..	Nil.	Nil.	Nil.	Do.	Nil.
110	10	Tobacco ...	Do. ...	F. Y. M....	10 tons ...	June ...	Continuous.	Nil.
111	10	Do. ...	Do. ..	Do. ...	Do. ...	Do. ...	Do. ...	Nil.
112	10	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Nil.
113	10	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Nil.
114	10	Bájri ...	Do. ...	Do. ...	Do. ...	Do. ...	Rotation ...	Nil.
115	10	Fallow ..	.....	.....	.....	.....	Do. ...	
116	10	Tobacco ...	Ordinary ...	F. Y. M....	10 tons ...	June ...	Rotation ...	Nil.
117	10	Fallow ..	.....	...	.....	.....	Do. ...	
118	10	Bájri ...	Ordinary ...	F. Y. M. ...	10 tons ...	June ...	Continuous.	Nil.
119	10	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Nil.
120	10	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do ...	Nil.
121	10	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Nil.

N B.—Plots Nos. 112, 113, 118, 119 are ring plots to test the contemporaneous effects of a fallow and are not under experiment.

The results of Bájri are as under :—

Plot No.	Crop.	Manure.	Yield per acre.		Value of produce.	Cost of cultivation.	Remarks.
			Grain.	Fodder.			
			Lbs.	Lbs.	Rs. a. p	Rs. a. p.	
109	Bájri ...	Nil	376	3,744	21 4 8	16 9 8	In rotation with tobacco.
114	Do. ...	Nil	536	4,648	26 7 4	39 15 0	In rotation with fallow.
118	Do. ...	Farmyard manure.	624	4,912	30 12 4	38 13 0	Continuous.
119	Do. ...	Do. ...	308	4,1 0	17 12 0	37 7 0	Do.
120	Do. ..	Do. ...	416	3,488	21 14 0	36 9 0	Do.
121	Do. ..	Do. ...	508	3,728	24 12 0	34 1 0	Do.

The crop is below the average.

The results of tobacco are as under :—

Plot No.	Crop.	Manure.	Yield per acre.	Value of produce	Cost of cultivation.	Remarks.
			Cured leaves.			
			Lbs.	Rs. a. p.	Rs a. p	
108	Tobacco ...	Farmyard manure.	280	22 6 4	45 6 8	Damaged by wilt.
110	Do. ...	Do. ...	328	26 3 8	45 6 4	Do.
111	Do. ...	Do. ...	968	58 1 4	51 5 8	Damaged by rain.
112	Do. ..	Do. ...	816	65 4 4	50 8 8	
113	Do. ..	Do. ...	1,024	61 7 0	57 0 8	Damaged by rain.
116	Do. ..	Do. ...	1,400	84 0 0	62 0 0	Do.

Experiments on crops grown continuously.

16. The object was—

(1) to see how long the following crops can be grown profitably without any manure on the same plots;

(2) to see the effects of deep and ordinary ploughing on Kodra mixture and on Bájri mixture grown continuously.

The following crops were grown continuously :—

(*a*) Bájri and mixture.
(*b*) Kodra and mixture.
(*c*) Bájri.
(*d*) Cotton, Broach.
(*e*) Tobacco (dry).

The Bájri and Kodra mixtures were grown on the following plots :—

Plot No. 137.—Area 5 gunthas, ordinarily ploughed, not manured, sown with Bájri and mixture.

Plot No. 139.—Area 5 gunthas, ordinarily ploughed, not manured, sown with Kodra and mixture.

Plots Nos. 138, 140.—Area 5 gunthas each, deeply ploughed, otherwise crops and treatment same as in plots 137 and 139 respectively.

The results of Bájri mixture are as under :—

Crop.	Plot No. 137 ordinarily ploughed.				Plot No. 138 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
Bájri	472	3,696	23 8 8	29 11 4	360	3,128	19 8 0	32 3 4
Math	16	96	0 9 4		24	128	0 13 4	
Mag	456	2,256	18 12 0		400	2,282	16 15 4	
Tuver	376	498	13 11 4		296	323	10 12 8	
Total ...	...	...	56 9 4	29 11 4	...	...	48 1 4	32 3 4

The results of Kodra mixture are as under :—

Crop.	Plot No. 139 ordinarily ploughed.				Plot No 140 deeply ploughed.			
	Yield per acre.		Value of produce.	Cost of cultivation.	Yield per acre.		Value of produce.	Cost of cultivation.
	Grain.	Straw.			Grain.	Straw.		
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs a. p	Rs. a. p.
Kodra	944	1,936	18 7 4	19 3 4	616	1,272	12 4 0	21 11 4
Tal	200	...	16 14 0		200	...	16 14 0	
Sheria	112	56 fibre	5 6 8		152	80 fibre	7 8 8	
Tuver	552	616	20 3 4		408	453	14 14 8	
Total ...	...	...	60 15 4	19 3 4	...	...	51 7 4	21 11 4

Cotton, Bájri and tobacco crops were grown on the following plots :—

Plot No. 97.—Area 6 gunthas, ordinarily ploughed, not manured, sown with Broach cotton.

Plot No. 98.—Area 6 gunthas, ordinarily ploughed, not manured, sown with Bájri.

Plot No. 101.—Area 4½ gunthas, ordinarily ploughed, not manured, planted with tobacco.

The results are as under :—

Plot No.	Crop.	Manure.	Yield per acre.		Value of produce.	Cost of cultivation.
			Grain.	Straw.		
			Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
			Seed cotton.			
97	Cotton	Nil ...	263	...	21 6 2	13 13 1
98	Bájri	Do. ...	360	2,833	22 3 0	25 3 10
			Cured leaves			
101 B	Tobacco	Do. ...	533	...	42 6 10	38 5 1

Bájri was damaged by rain. More than half the area of cotton was destroyed by wilt.

Cultural Experiments.

Series I.—The object was—

(1) to compare Bájri and Bájro sown 1′ apart with Bájri and Bájro sown 1½′ apart ;

(2) to compare the yield of Bájri with that of Bájro ;

(3) to compare Broach cotton sown 1½′ apart with cotton sown 2′ apart.

Bájri and Bájro were grown on the following plots :—

Plot No. 104.—Area 10 gunthas, ordinarily ploughed, not manured, sown with Bájri 1′ apart.

Plot No. 105.—Area 10 gunthas, ordinarily ploughed, not manured, sown with Bájro 1′ apart.

Plot No. 122A.—Area 8½ gunthas, ordinarily ploughed, not manured, sown with Bájri 1½′ apart.

Plot No. 122B.—Area 8½ gunthas, ordinarily ploughed, not manured, sown with Bájro 1½′ apart.

The results of Bájri and Bájro are as under :—

Plot No.	Crop.	Treatment.	Yield per acre.		Value of produce.	Cost of cultivation.
			Grain.	Straw.		
			Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
104	Bájri ...	Sown 1′ apart ...	464	4,472	25 8 0	16 13 8
1·2A	Do. ...	Sown 1½′ apart ..	480	4,094	25 6 3	18 5 3
105	Bájro ...	Sown 1′ apart ...	224	3,068	17 12 0	17 5 8
122B	Do. ...	Sown 1½′ apart ...	237	2,626	15 3 6	17 11 10

The crops are below the average. Bájri sown 1′ apart has given the better return, while Bájro sown 1½′ apart has given the better outturn.

Cotton was sown under similar conditions in the following plots :—

Plot Nos. 102-103.—Area 10 gunthas each, ordinarily ploughed, not manured, and sown with Broach cotton 1½′ apart.

Plot Nos. 106-107.—Area 10 gunthas each, ordinarily ploughed, not manured, sown with Broach cotton 2′ apart.

The results are as under :—

Plot No.	Crop.	Treatment.	Yield of seed cotton per acre.	Value of produce.	Cost of cultivation.
			Lbs.	Rs. a. p.	Rs. a. p.
102	Broach cotton ...	Sown 1½′ apart ...	228	18 8 4	17 0 4
103	Do. ...	Do. ...	694	56 7 0	18 4 4
106	Do. ...	Sown 2′ apart ...	394	32 0 4	16 13 0
107	Do. ...	Do. ...	384	31 3 4	15 9 0

The plots were much affected by wilt disease.

18. *Series II.*—The object was to compare Bájri and Guwár sown as separate crops with Bájri and Guwár sown mixed together.

Plot Nos. 123-124.—Area 1 acre, ordinarily ploughed, not manured, sown with Bájri and Guwár mixed together.

Plot Nos. 125-126.—Area 1 acre, ordinarily ploughed, not manured, sown with Guwár.

The results are as under :—

Plot No.	Crop.	Manured.	Yield per acre.		Value of produce.	Cost of cultivation.
			Grain.	Fodder.		
			Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
104	Bájri	Nil ...	464	4,172	25 8 0	16 13 8
125, 126	Guwár	Do. ...	865	864	23 5 8	10 13 10
123, 124	Bájri	Do.	352	4,266	29 2 4	21 12 8
	Guwár	Do. ...	380	355		

Bájri was damaged by rain. This year Guwár alone seems to be profitable.

Trial of new crops.

19. *Cotton.*—The object was—

(1) to introduce Lálio and Wágad cottons which are extensively grown in the Ahmedabad District;

(2) to see whether Lálio cotton can be grown profitably with irrigation.

The results are as under:—

Plot No.	Area.	Crop.	Tillage.	Manure.	Irrigated or not.	Yield of seed cotton per acre.	Value of produce.	Cost of cultivation.
						Lbs.	Rs. a. p.	Rs. a. p.
81, 82	20	Lálio ...	Ordinary .	F. Y. M. .	Irrigated .	709	57 11 0	52 7 8
127	20	Do. ...	Do. ...	Nil ...	Nil ...	491	39 14 4	15 6 4
128	20	Wágad ...	Do. ...	Do. ...	Do. ...	311	25 4 4	16 8 2

Lálio irrigated was a very promising crop but nearly half the area was destroyed by "wilt disease."

20. *Dhárwár-American cotton.*—About 20 gunthas were sown with this cotton. The germination was not satisfactory. The germinated plants were attacked with white ants and wilt disease. The whole plot was ploughed in.

The following varieties of cotton were sown on a small area to see the variation in the percentage of lint due to differences in soil and climate:—

No.	Name of the cotton variety.	Percentage of lint to seed-cotton.
1	Devkapás	25·3
2	Rozi	26·3
3	Naden	31·6
4	Wágad	28
5	Kumpta	27·5
6	Broach	31·8
7	Goghári	33·3
8	Mathio	27·2
9	Jari	28·5
10	Varádi	35·2
11	Comilla	44·5
12	Bani	26

21. *Bájri.*—The following new varieties were grown :—

(1) Natal Bájri.
(2) West African Bájri.

The results are as under :—

Plot No.	Area in gunthas.	Crop.	Tillage.	Manure.	Yield per acre.		Value of produce.	Cost of cultivation.
					Grain.	Fodder		
					Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
96	13	Natal Bájri ...	Ordinary .	Nil ...	323	4,997	19 8 3	17 4 6
142	6	West African Bajri.	Do. ...	Do. ...	1,066	5,506	37 15 9	27 2 5

Natal Bájri was much damaged by rain. The growth was just like ordinary Bájri : the ear was somewhat longer and the grain smaller.

West African Bájri was not much affected by rain. The stalks were thick with plenty of aëreal roots. The leaves were broader than ordinary Bájri plants and the appearance of the crop was like maize. The ears were very long, some measuring 21 inches. The grain was very small and yellow.

22. *Soybeans.*—The following varieties of soybeans were grown :—

I.—Black-seeded.
II.—Yellow-seeded.
III.—Extra early black-seeded.
IV.—Extra early.

These varieties were first sown in May. The germination was not satisfactory owing to excesssive heat. The germinated plants were parched up. The seed was again sown in the monsoon. The germination was fair. The plants were progressing well till the end of August, but owing to heavy and constant rains all the plants rotted. The yield was practically nothing. A few plants only seeded.

23. *Groundnut.*—The object was to treat the plots as a protection against white ants.

Four plots, each one guntha in area, were put under groundnut as under :—

(1) To be treated with Jámbho as green.
(2) To be treated with kerosine.
(3) To be treated with castor-cake.
(4) To be treated with nothing.

The results are as under :—

Area in gunthas.	Crop.	Treatment.	Number of waterings.	Yield per acre.		Extent of damage.	Remarks.
				Good Pods.	Rotten Pods.		
1	Groundnut.	Green manure of Jámbho.	7	7[illegible]0	440	33·3 per cent	Jámbho was grown in the cold weather of 1903 and was ploughed in; a few patches were made by white ants. Crop was looking rather pale.
1	Do. ...	Castor-cake...	7	1,120	320	27·7 ,, ...	A few plants were seen destroyed by white ants; 15 lbs. castor-cake was applied in 2 doses.
1	Do. ...	Kerosine ...	7	840	2[illegible]0	25 ,, ...	Kerosine 3 lbs. was applied to 6 waterings; a few plants were seen attacked by white ants. Crop looked paler.
1	Do. ...	Nil ...	7	680	480	41·3 ,, ..	Much attacked with white ants. Crop much paler.

Green manure in addition to its manurial value seems to have some effect on white ants.

Castor-cake seems to have less effect on white ants than kerosine, but appears to influence the yield greatly.

The kerosine oil appears to have had a good effect on white ants.

24. *China mustard.*—Two varieties, *viz.*, Cai Trang and Cai Sen, were transplanted in December. The plants grew very luxuriantly but the yield of grain was very poor.

The percentages of oil in these varieties are as under :—

Cai trang	...	...	30·57 per cent.
Cai sen	...	...	31·42 „

25. *San.*—This year again san was sown for fibre and seed. The plants grew very vigorously but owing to heavy rains no pods were formed.

The results are as under :—

No.	Area in gunthas.	Crop.	Yield per acre.		Value of produce.	Cost of cultivation.
			Grain.	Fibre.		
			Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
96	12	San ...	66	473	25 5 3	28 0 7

Extracting fibre by hired labour is very costly. A sample of San fibre was valued by the Bombay Chamber of Commerce at Rs. 60 per candy of 588 lbs. and of Ambádi at Rs. 40.

26. *Kamod rice.*—Kamod rice was again planted this year, but owing to the sandy nature of the soil it was not successful as this variety requires plenty of water. It was watered four times from the well.

The following are the results :—

No.	Area in gunthas.	Crop.	Treatment.	Yield per acre.		Value of produce.	Cost of cultivation.
				Grain.	Fodder.		
				Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
92	7	Rice ...	F. Y. M. ...	685	2,783	39 4 7	55 9 0

27. *Barley.*—A sample of a six-rowed barley variety called Mandeschendi was sown on a small area in the rabi season. The seed did not germinate.

28. *Wheat barley.*—A sample of wheat barley from Cawnpore was sown on a small area. The germination was good. The plants did not grow vigorously. They were smaller than ordinary barley. The yield was poor, *viz.*, 120 lbs. per acre.

29. *Tobacco.*—The following statement gives the details of several varieties of tobacco grown on this farm:—

Name of the variety.	No. of ripe leaves.	Height of the plant.	Measurement of the top leaf.	Measurement of the largest leaf.	Remarks.
Talaon ...	17	2′ 10″	7″ × 14″	11″ × 18″	Greenish, thickest, not spotted.
Havana ...	15	2′ 8″	6″ × 11″	12″ × 16″	Reddish, thick, brittle spotted.
Java P. ...	16	3′ 5″	6″ × 10″	11½″ × 15″	Yellowish, thick, spotted.
Wlingi ...	18	2′ 6″	7″ × 11″	9½″ × 15″	Whitish, thick, spotted.
Spanish ...	16	2′ 10″	6½″ × 10″	9″ × 14″	Reddish yellow, thick midrib, very thick spotted.
Florida ...	18	3′ 2″	5½″ × 13″	9″ × 15½″	Yellowish leaves thin and narrow.
Java D. ...	19	3′ 5″	7½″ × 12″	9½″ × 15″	Yellowish, brittle thick and narrow.
Sumatra ...	21	3′ 6″	7″ × 12″	9″ × 15″	Yellowish, leaves conical.

All these varieties are more or less degenerating. A curing house is now constructed and experiments on curing on improved methods will be undertaken next season.

Pests.

30. *Sugarcane borer (Chilo simplex).*—The attack was detected in May when the sugarcane sets were sprouting. The attack was severe and the damage done to the young crop was great.

31. *Caterpillars.*—The crops of rice, tobacco, cotton and brinjals were attacked with caterpillars. The attack was slight.

32. *Kátras or hairy caterpillars.*—In the beginning of July Kátras were seen attacking Bájri, cotton, San, etc. They preferred San to other crops. The attack was slight.

33. *White ants.*—Owing to the sandy nature of the soil white ants are very disastrous. The whole crop of chillies and sugarcane was damaged by them.

34. *Smut.*—See above.

The farm seed was steeped before sowing in ½ per cent. copper sulphate solution but unfortunately the printed instructions followed (not issued by me) were faulty. Correct instructions have now been issued.

35. *Wilt disease.*—Some of the cotton and tobacco plots were very much damaged by this disease.

36. *Bángdi blight.*—A very few plants of potatoes were seen attacked with this blight in the young stage. The damage was very slight. The attacked plants were removed and burnt.

37. *Mildew.*—On account of rain in the beginning of February the crop of jiru was attacked with mildew. Subsequently much more damage was done to the crop by subsequent rain than by mildew.

Cross Breeding.

38. Several crosses made last year were sown this season. The following crosses grew vigorously :—

Tree cotton + Abassi.
Do. + Sea Island.
Do. + Texas big boll.

The following table gives the details of crosses made during this year :—

Rough Peruvian × Kidney.			Kidney × Rough Peruvian.			Kidney × 16 x.		
Number of flowers crossed.	Number of bolls formed.	Number of bolls obtained.	Number of flowers crossed.	Number of bolls formed.	Number of bolls obtained.	Number of flowers crossed.	Number of bolls formed.	Number of bolls obtained.
64	50	9	134	72	43	55	20	12

Irrigational Experiments.

39. To find out what quantity of water is required by each irrigated crop, the quantity of water supplied at each irrigation was measured either through the rectangular notch or by measuring tanks.

The following table gives the details of the quantity of water taken by several crops per acre during the year under report :—

Crop.	Quantity of water at the time of sowing.	Quantity of water at the first watering.	Quantity of water at the 2nd watering.	Total Number of waterings.	Total quantity of water applied.
	Gallons.	Gallons.	Gallons.		Gallons.
Tobacco	Nil.	41,250	40,000	3	112,825
Variáli	Do.	56,250	70.000	9	486,912
Chillies	Do.	82,500	52,500	13	562,700
Wheat	107,500	76,250	80,000	7	500,262
Rice	Nil.	94,117	67,575	2	161,692
Brinjals	Do.	44 444	41,666	12	524,830
Jiru	77,500	43,750	37,500	4	201,250
Lálio cotton	Nil.	60 000	40,000	3	127,250
Potatoes	97,500	37,500	37,500	7	313,750
Sundhia Jowár	64,650	66,562	42,975	6	294,262
Onion	60,000	37,500	38,812	14	528,487

New Implements.

40. Watt's chain plough works well in the moist alluvial soils. It is like a Swedish plough with one handle.

Other implements, such as Turn-wrest plough and the Nile plough, continue to give satisfaction.

Experiments made off the Station.

41. To make popular special fertilizers sodium nitrate was distributed to cultivators for trial on tobacco. The fields were manured and irrigated as usual.

Sodium nitrate was applied at the rate of 120 lbs. per acre to half the plot in addition to the farmyard manure. The cost of sodium nitrate is Rs. 12 per acre.

The results are as under :—

Field No.	Area.	Manure used.	Yield of cured leaves per acre.	Value of produce.	Increment in value due to sodium nitrate.
			Lbs.	Rs. a. p.	Rs. a. p.
1	14	Farmyard manure	1,045	104 9 0	33 14 0
	23	Farmyard manure and sodium nitrate	1,384	138 7 0	
2	24	Farmyard manure	1,283	128 5 0	27 13 0
	24	Farmyard manure and sodium niture	1,561	156 2 0	
3	32	Farmyard manure	2,296	229 10 0	-25 8 0
	32	Farmyard manure and sodium nitrate	2,041	204 2 0	

In the first two fields the sodium nitrate has produced a better outturn.

Engine and Pump.

42. The oil engine and pump installed for irrigation purposes on this farm are working well. The details were reported in the last report.

Ensilage.

43. This season the silo was filled with green grass. In September 65,000 lbs. green grass was put in the silo within four days. The contents were covered with a layer of earth 1½′ deep on the top. The silo was opened on the 14th April. The grass on the sides of the wall of the silo was rotten to the extent of 6″ all round.

The following analyses show the comparative value of silage made from grass and green Sundhia. Silage will be of great use in the hot weather where dairy cattle are kept :—

	Sundhia silage.	Green grass silage.	Remarks.
Moisture	51·69	73·64	Sundhia silage was reported on as a sample of very good silage, and that of the green grass as an average sample of moderately sour silage.
Oil, wax, &c.	1·96	1·31	
Albuminoids	2·87	1·70	
Soluble carbohydrate ...	21·05	12·26	
Woody fibre	15·52	7·77	
Soluble mineral matter ...	2·93	1·45	
Sand	3·98	1·87	
	100·00	100	
Total nitrogen ...	·806	·342	
Albuminoid nitrogen ...	·463	·272	

Poona,
September 1907.

F. FLETCHER,
Deputy Director of Agriculture.

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INCLUDING

KIRKEE CIVIL DAIRY

AND

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FOR THE YEAR

1906-1907

BY

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Vernacular names of Crops, &c., mentioned in the report and their Botanical and English equivalents.

Botanical.	English.	Vernacular.
Cereals.		
Andropogon sorghum var. vulgare...	Great millet ..	Jowár (Utávali, Hundi, Shálu, Nilva, Cholam, &c.).
Do. var. cernuum.	Do. ...	Sundhia.
Pennisetum typhoideum ...	Bull rush millet ...	Bájri.
Triticum sativum ...	Wheat ...	Gahu (Káláhusal, Dandkháni, Shet, &c.).
Do. speltum ...	Spelt ...	Khapli.
Oryza sativa ...	Rice, Paddy ...	Bhát (Ambemohor, Dodka, Kamod, &c.).
Elusine corocana ...	Muma millet ...	Náchani, Nágli.
Paspalum scrobiculatum ...	Kodra millet ...	Kodra.
Panicum miliaceum ...	Common millet ...	Sáva, Vari, Chino, Dhengli.
Do. italicum ...	Italian millet ...	Rála.
Avena sativa ...	Oats ..	Vat.
Zea mays ...	Maize ...	Maka.
Sorghum sachharatum ...	Sorghum ...	Amber, Collier (exotic).
Panicum crusgalli var. frumentaceum.	.....	Barti, Banti.
Setaria italica ...	Italian millet ...	Káng.
Setaria glauca ...	Bottle grass ...	Bhádli.
Fagopyrum esculentum ...	Buck wheat ...	Kutu.
Pulses.		
Cajanus indicus ...	Pigeon pea ...	Tur.
Cicer arietinum ...	Gram ...	Harbhara.
Phaseolus mungo ...	Green gram ...	Mug.
Do. radiatus ...	Black gram ...	Udid.
Do. aconitifolius ...	Kidney bean ..	Math.
Dolichos catiang ...	Cow pea ...	Chavli, Choli.
Do. biflorous ...	Horse gram ...	Kulith.
Pisum sativum ...	Pea ...	Vátána.
Lathyrus sativus ...	Jarosse ...	Lákh, Lang.
Ervum lens ...	Lentil ...	Masur.
Cyamopsis psoralioides ...	Field vetch ...	Guvár.
Glycine hispida ..	Soybean ...	(Exotic.)
Oil-seeds.		
Arachis hypogea ...	Groundnuts ...	Bhuimug.
Linum usitatissimum ...	Linseed ...	Javas.
Carthamus tinctorius ...	Safflower ...	Kardai.
Ricinus communis ...	Castor ...	Erandi.
Pongamia glabra ...	.....	Karanj.
Guizotia abissynica ...	Niger seed ...	Kárhale.
Fibres.		
Gossypium herbaceum ...	Cotton ...	Kápus (Brosch, Kumpta, Goghári).
Do. hirsutum ...	American cotton ...	Viláyati Kápus.

Botanical.	English.	Vernacular.
Fibres—*continued.*		
Gossypium neglectum ...	Khándesh cotton ...	Varádi Kápus.
Do. indicum ...	Hinganghát cotton ...	Bani, Chánda Kápus.
Do. arboreum ..	Tree cotton ...	Dev Kápus.
Corchorus Capsularis ...	Jute ...	.....
Crotolaria juncea ..	Bombay hemp ...	San.
Hibiscus cannabinus ...	Hemp ...	Ambádi.
Condiments.		
Capsicum frutescens ...	Chillies ...	Mirchi.
Vegetables.		
Ipomœa batatas ...	Sweet potato ...	Ratálu.
Solanum melongena ...	Brinjal ...	Vángi.
Phaseolus lunatus ...	Lima bean ...	Dabbal-bee.
.....	Velvet bean ...	(Exotic.)
Grasses.		
Medicago sativa ..	Lucerne ...	Lasun ghás.
Panicum jumentorum ...	Guinea grass ...	(Exotic.)
Do. muticum ...	Water grass ...	Do.
Reana luxurians ...	Teosinte ...	Do.
Miscellaneous.		
Morus indica ...	Mulberry ...	Tut.
Manihot utilissima ...	Tapioca ...	(Exotic.)
Musa sapientum ...	Plantains ...	Kel.
Mimosops hexandra ...	(Timber tree) ...	Ráyan.
Calophyllum inophyllum ...	Alexandrian Laurel ..	Undi.
Terminalia tomentosa ...	(Timber tree) ...	Ain.

I.—THE POONA AGRICULTURAL STATION, 1906-1907.

Established—1879; *North Latitude*—18° 30′; *East Longitude*—73° 50′; *Elevation*—1,850 feet above sea level; *Soil*—¾ medium black and ¼ light *murum*; *Average rainfall*—32 inches; *Temperature*—maximum 108° in May, minimum 42° in February.

Superintendent—Mr. V. K. Kogekar.

Area—66 acres.

	April 1906.	May	June.	July.	August	September.	October.	November.	December	Janv. 1907.	February.	March.	Total.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-1907) ...	0 26	0 26	9 8	3 86	4 25	1 66	3 28	0 47	0 4	0 2	...	0 10	23 23
Average	0 88	1 34	6 2	8 53	4 77	4 33	5 13	0 48	0 31	0 1	0 10	0 2	31 92
Temperature—													
Mean maximum	103°	101°	88°	82°	82°	82°	90°	86°	86°	87°	90°	96°	
Mean minimum	67°	72°	72°	71°	69°	67°	63°	55°	55°	53°	56°	61°	

I.—History.

2. The Poona Station had its origin in a small piece of land taken for the agricultural class at the College of Science, which was opened in 1879. In 1882 this area was extended to 66 acres. Up to 1888 it was in charge of the Lecturer in Botany and Agriculture at the College. But in that year it was handed over to the Agricultural Department where it has remained ever since. Primarily the Station was for demonstration in agriculture to the students. Upon other agricultural problems arising the Station was used for experimental purposes.

A small area has for the last three years been devoted to raising varieties for Professor Gammie's classification.

II.—Area, character of Soil and Irrigation.

3. The Poona Station consists of Survey Nos. 57, 59 and 60 of Bopudi, situated about 2 miles from Poona. Of this area about 35 acres are arable while the rest is used for building and pasturage; 26 acres and 19 gunthas are medium black soil and 8 acres and 3 gunthas light soil. Survey Nos. 57, 59 and 60 are irrigable

from the Mutha Left Bank Canal. Survey No. 57, which is occupied by the pasturage and most of the buildings, may be considered as belonging to the Dairy.

III.—Line of work.

4. This year the Station entered on a new phase of work. Up to this time it was used partly as an educational and partly as a fodder-producing farm. But owing to the opening of a new Station in connection with the scheme of a separate Agricultural College this Station has become purely an experimental and demonstrative one.

The area which was set apart as a Dairy farm and used principally for raising fodder for the Dairy was also utilized this year for experimental purposes, the fodders being raised on the College Station.

The principal lines of experiments are noted below :—

(1) Cultivation of the different types of cottons (*a*) for resting the land successively cropped to fodders, (*b*) for selection of a cotton better adapted to the Deccan conditions of irrigated cultivation.

(2) Growing of tree cottons on light soil portions of the Station to determine their productive quality.

(3) Growing of varieties of Jowár, Bájri, maize and Tur for seed.

(4) Growing a set of varieties in small plots of pulses and millets for classification by the Economic Botanist.

(5) Growing light soil crops and variety tests.

(6) Trial of different green manures on wheat.

(7) Cultivation of rabi pulses in rotation after fodder Jowárs to hold the land in good condition.

(8) Fibre crops for comparative fibre test.

(9) Plant diseases. The work with Tikka disease of groundnut and Wilt disease of Tur was continued.

(10) Growing of varieties of groundnuts on areas not known to be affected with Tikka.

(11) Trial of new crops.

IV.—Meteorology.

5. The rainfall was somewhat below the average but was well distributed.

There were no anti-monsoon showers for the preparation of the land. The regular monsoon burst seasonably in the 1st week of June. Sowing at the Station commenced in the 2nd week of June. The rains during the second fortnight of July, August and September were timely and saved the crops which otherwise would have suffered from want of moisture. During long breaks the crops were irrigated. The rainfall in the 1st week of October was useful for the sowing of rabi crops. Owing to the failure of rains in November and December the rabi crops had to be irrigated from the canal.

V.—Area planted to different crops.

6. The following statement shows the area cropped and the purpose of each crop :—

Field No.	Kharif crop.	Area.		Purpose.	Rabi crop.	Area.		Purpose.
1	2	3		4	5	6		7
		A.	g.			A.	g.	
1	Kulthi ..	0	30	Green manure ...	Oats ..	0	30	For seed.
1	Guinea grass ...	0	20	For fodder. Perennial.	.....	...		.....
2	Do. ...	0	10	Do. ...	.....	...		.....
2	Cotton, Broach ...	0	30	Seed selection for irrigated cotton.	.....	...		.....
2	Cotton, Ghogári ...	0	20	Do. ...	.....	...		.....
2	Cotton, Kumpta ...	0	20	Do. ...	.....	...		.....
2	American cotton ...	0	1	Further acclimatization.	.....	...		.....
3	Tree cottons ...	0	15½	Testing the cottons on light soil.	.....	...		.....
3	Guinea grass ...	0	4½	For fodder. Perennial .	.....	...		.....
3	Barti	0	10	For seed	.....	...		.....
3	Maize, Golden Beauty and Chavli (1½ ft. long legume).	0	10	Do.	.....	...		.....
4	Cotton, Varádi ...	0	15	Seed selection for irrigated cotton.	.....	...		.....
4	Bájri and Tur, red Khándeshi.	0	20	Selection and test of samar.	.....	...		.....
4	Groundnut, Pondicherry .	0	20	For seed	.....	...		.....
4	,, Virginia ...	0	20	Do.	Khapli ...	0	20	For fodder.
	,, Poona local .	0	10	Do.	.....	...		.....
4	Guinea grass ...	0	10	For fodder. Perennial.	.....	...		.....
4	Tree cottons ...	1	15	Testing tree cottons on light soil.	.....	...		.....
5	Cotton, Bani ...	0	20½	Seed selection for irrigated cotton.	.....	...		.....

Field No.	Khariff crop.	Area.		Purpose.	Rabi crop.	Area.		Purpose.
1	2	3		4	5	6		7
		A.	g.			A.	g.	
5	Cotton, Chinda ...	0	15	Seed selection for irrigated cotton.	.....	...		.....
5	Buck wheat ...	0	18½	To test the crop on light soil.	.....	...		.....
6	Guinea grass ...	0	12	For fodder. Perennial.	.....	...		.....
6	Sweet potatoes ..	0	20	For botanical study ...	.....	...		.....
6	Tapioca varieties .	1	11	Variety identification .	.....	...		.....
6	Tur	0	18	Study of wilt disease ...	.....	...		.....
6	Soy-beans	1	8	Variety test ...	.....	...		.....
7	Tree cottons ...	0	12	Botanical study ...	.....	...		.....
7	Chillies	0	15	Test of yield ...	.....	...		.....
7	Brinjals	0	9	Do, ...	.....	...		.....
7	Guinea grass ...	1	0	For fodder. Perennial.	.....	...		.....
8	Groundnut	...		Study of Tikka disease.	Khapli ...	0	34	For fodder.
...	.....	...		.....	Gram ...	0	6	Study of gram wilt.
8	Water grass ...	0	2	To occupy a moist place. Perennial.	.....	...		.....
8	Plantains ...	0	2	Do. ...	.....	...		.....
9	Guinea grass ...	0	18	For fodder. Perennial.	.....	...		.....
9	Plantains ...	0	6	To occupy a moist place. Perennial.	.....	...		.....
9	Pulses and millets .	1	0	Botanical classification.	.....	...		.....
9	San ...	0	15	Test of comparative fibre.	.....	...		.....
9	Ambádi ...	0	2)	Do. ...	.....	...		.....
10	Sorghum ...	0	15	For seed ...	Wheat varieties and crosses.	...		Variety tests.
10	Cawnpore maize ..	0	15					
10	Tur, variegated Bangalore.	0	4½					
10	Tree cottons ...	0	2	Botanical study ...	.....	...		.....
10	Guinea grass ..	2	28	For fodder. Perennial.	.....	...		.....
11	San, Chavli, Soybeans and velvet beans.	2	6	Green manures ...	Wheat ...	2	28	Variety tests.
12	Sundhia ...	0	11	For seed	Lang ...	0	11	Rotation.
12	Nilva ..	0	11	Do.	Gram, Kábuli...	0	11	Do.
12	Utávali ...	0	11	Do.	Masur ...	0	11	Do.
13	Rice varieties ...	0	34	Do.	.....	...		.....
14	Mulberry ...	0	33	For starting a plantation. Perennial.	.....	...		.....
15	Jawnpore Maize and Tur, Barámati.	0	20	For seed	.....	...		.....
...	Yellow Cholam ...	0	29	Do.	.....	...		.....
...	Reana luxurians ...	0	20	Do.	.....	...		.....

Field No.	Khariff crop.	Area.		Purpose.	Rabi crop.	Area.	Purpose.
1	2	3		4	5	6	7
		A.	g.			A. g.	
...	African Bájri and Tur, Red Bellary.	0	10	For seed ...	.....	...	.....
...	Broom Corn ...	0	10	Do. ...	.....	...	.....
...	Sindh Bájri and Castor, Peruvian.	0	10	Do. ..	.....	...	.....
...	Nilva ...	0	5	Do. ...	.....	...	.....
...	Utávali ...	0	5	Do. ..	.....	...	.....
...	Guinea grass ...	0	9	For fodder. Perennial...	.....	...	.....
16	Jute ...	0	10	Trial of new crop ...	.....	...	.....
16	Garden vegetables ..	2	13	For study of general culture.	.....	...	.....
16	Guinea grass ...	0	4	For fodder. Perennial.	.....	...	.....

VI.—Crop Diseases and Insect Pests.

7. Red bugs on cotton, sugarborer on Jowár, catterpillar on Sau, bugs and leaf-eating beetles on almost all the crops were among the insect pests. The damage from these was not of a serious nature. The red cotton bugs were collected and destroyed. The other pests were checked by hand-picking where possible.

Smut appeared on both Bájri and Jowár. The smutted heads of Bájri were sent to the Imperial Mycologist for examination. He writes thus:—"This is the first occasion I have seen such a disease on this cereal and the fungus is probably a new species."

The wheats were attacked by rust the common Puccinia Grammonis, and the gram by wilt caused by a species of Fusarium.

8. *Tikka disease of groundnut.*—In all five varieties of groundnuts were grown on the plot devoted to the study of this disease. The varieties were sown on the 30th of June. The germination of all was fair. The disease first made its appearance on the 23rd of July 1906 on three varieties, *viz.*, Spanish peanuts, small Japanese and Virginia and gradually spread to all the rest.

The diagrammatic statements overleaf show the relative positions of the plots, the treatment and the yields in lbs. per acre for the two seasons 1905-06 and 1906-07. The yields are written on each plot :—

YIELD OF GROUNDNUT IN THE PLOTS OF FIELD No. 8 (SEASON 1905-06 & 1906-07)

1905-06.

N ↑

SPANISH — PEANUTS	256	302	142	65	125	158	240	221	16'
SMALL — JAPANESE	293	467	353	221	238	392	479	231	34'
LARGE — JAPANESE	1094	1363	1152	1042	877	1629	1008	854	32'
VIRGINIA	812	1040	1001	928	813	846	812	799	32'
TATA'S — GROUNDNUT	1125	1425	1517	1523	1188	1829	1154	766	16'
PONDICHERRY	1079	1509	1444	1509	1079	990	936	501	16'
POONA — LOCAL	686	749	833	770	749	504	592	385	27'
Spraying treatment	50 gal. twice	50 gal. twice.	50 gal once.	Not sprayed.	Not sprayed	50 gal. once	50 gal. twice	50 gal. twice.	
	Seed steeped					Seed unsteeped			

1906-07

N ↑

SMALL — JAPANESE	192	232	286	168	136	128	128	56	40'
SPANISH — PEANUTS	1160	880	880	520	320	280	240	460	16'
VIRGINIA	1020	720	1620	813	740	420	643	590	48'
PONDICHERRY	600	680	340	600	320	250	340	290	32'
POONA — LOCAL	180	440	433	253	453	340	320	266	24'
Spraying treatment	100 gal. twice	50 gal. thrice.	50 gal. twice.	Not sprayed.	Not sprayed.	100 gal. once.	75 gal. once.	50 gal. once.	
	Seed unsteeped.					Seed steeped.			

(NOT TO SCALE.)

From the statements given it is probable that neither spraying nor steeping has had any effect but that the differences in the yields of the plots are due to differences in the soil.

The yield on the average decreases from west to east and this may be due to the fact that on the west was a heavily watered plot of Guinea grass or that the soil to the east is more seriously infected.

9. *Wilt disease of Tur.*—All the nine varieties of Tur, which had shown some resistance to the disease last year, were grown on the same piece of land. Out of the nine varieties six have shown a higher percentage of resistance this year than last year, and one has remained the same. The variety Sambalpore No. 9, which had shown above 78 per cent. of resistance last year, has gone down to 48 this year, while the last year's second best Biláspur No. 1 has increased in its percentage to 70. These results are probably due to variations in soil and season and not to any quality inherent in the varieties.

The statement below shows the counts taken, the percentage of resistance and yield per plant of the nine varieties :—

Serial Number.	Name of variety.	29th July 1906.	5th August 1906.	12th August 1906.	19th August 1906.	26th August 1906.	2nd September 1906.	9th September 1906.	16th September 1906.	23rd September 1906.	30th September 1906.	7th October 1906.	14th October 1906.	21st October 1906.
1	No. 9 Sambalpore ...	642	596	582	578	578	561	560	547	543	534	528	528	515
2	No. 1 Biláspur ...	920	900	898	893	883	865	864	860	847	843	835	809	800
3	No. 2 Biláspur ...	813	790	783	783	738	726	725	723	721	715	694	630	662
4	No. 3 Biláspur ...	466	466	446	443	425	425	425	421	416	407	389	380	379
5	No. 8 Sambalpore ...	141	127	126	125	114	103	100	93	91	87	74	65	63
6	No. 4 Sambalpore ...	113	108	100	87	85	78	75	68	64	55	44	42	39
7	No. 6 Sambalpore ...	1,021	961	936	931	898	884	866	860	852	846	811	770	766
8	No. 10 Sambalpore ...	159	154	151	145	137	136	135	130	125	118	112	111	111
9	No. 20 Variegated Bangalore.	2,502	2,426	2,402	2,382	2,281	2,220	2,116	2,207	2,201	2,154	2,102	2,086	2,056

Serial Number.	Name of variety.	28th October 1906.	4th November 1906.	11th November 1906.	18th November 1906.	25th November 1906.	2nd December 1906.	9th December 1906.	23rd December 1906.	30th December 1906.	6th January 1907.	13th January 1907.	20th January 1907.	27th January 1907.
1	No. 9 Sambalpore ...	514	515	503	503	502	500	499	497	445	427	422	415	409
2	No. 1 Biláspur ...	793	783	762	759	757	757	757	757	757	753	753	738	730
3	No. 2 Biláspur ...	633	632	629	609	608	603	598	596	567	521	521	520	513
4	No. 3 Biláspur ...	373	370	364	362	355	354	352	350	340	340	335	315	305
5	No 8 Sambalpore ...	65	56	52	51	51	51	50	49	49	45	42	38	37
6	No. 4 Sambalpore ...	36	36	35	35	35	35	35	33	32	32	30	27	25
7	No. 6 Sambalpore ...	757	746	743	731	731	728	726	713	683	633	633	623	615
8	No. 10 Sambalpore ...	110	108	103	103	103	102	98	96	92	88	86	82	81
9	No. 20 Variegated Bangalore.	3,027	2,014	1,951	1,959	1,955	1,947	1,933	1,899	1,820	1,757	1,727	1,632	1,580

Serial Number.	Name of variety.	3rd February 1907.	10th February 1907.	17th February 1907.	24th February 1907.	3rd March 1907.	10th March 1907.	17th March 1907.	24th March 1907.	Percentage of resistant plants in 1906-07.	Percentage of resistant plants in 1905-06.	Yield per plant.
												Drams.
1	No. 9 Sambalpore ...	398	331	377	361	360	351	319	313	48·7	77·8	3
2	No. 1 Bilaspur ...	729	726	726	719	697	672	657	648	70·4	51·6	·84
3	No. 2 Bilaspur ...	497	409	437	431	393	397	378	363	45·0	8·6	7
4	No. 3 Bilaspur ...	246	284	247	257	226	215	200	190	39·0	11·1	9·9
5	No. 8 Sambalpore ...	34	31	31	30	29	29	29	29	20·5	20·5	5
6	No. 4 Sambalpore ...	22	19	18	17	17	17	16	16	14·2	8·1	9
7	No. 6 Sambalpore ...	557	487	475	461	460	452	426	415	40·6	16·2	4·1
8	No. 10 Sambalpore ...	79	77	76	72	70	70	69	69	43·4	17·1	·52
9	No. 20 Variegated Bangalore.	1,383	1,353	1,294	1,277	1,208	1,168	1,119	1,031	41·2	22·1	2·6

VII.—Experiments with Fibre Crops.

10. *Cotton.*—Six varieties of cotton—Broach, Goghári, Kumpta of the herbaceum type, Bani and Chánda cold weather of the indicum and Varádi of the neglectum type were grown under irrigation.

They were top-dressed with Karanj (*Pongemia glabra*) cake and superphosphate at the rate of 1,000 lbs. and 400 lbs. per acre respectively.

The statement below gives the area, outturn, etc, of the several varieties grown:—

Field No.	Variety of cotton.	Area.		Date of sowing.	Date of flowering.	Yield per acre of seed cotton.	Percentage of lint to seed cotton.	Opinion of Messrs. Tata & Co.	Remarks.
1	2	3		4	5	6	7	8	9
		A.	g.			lbs.			
2	Kumpta ...	0	20	13th June 1906 ...	8th September 1906 ...	495	22·29	Class "Fully good." The cotton is clean and of good staple; value Rs. 250 per khandy.	Irrigated 5 times.
2	Goghári ...	0	20	" " ...	26th October 1906 ...	765	35·5	Class "Fine." Very clean and white, but the staple is medium and the fibre weak; value Rs. 240 per khandy.	" "
2	Broach ...	0	30	" " ...	29th October 1906 ...	925	29·5	Same as Goghári, but better in staple; value Rs. 265 per khandy.	" "
4	Varádi ...	0	15	10th July 1906 ...	26th September 1906 ...	548	34·56	Dull colour, stained and no staple; value Rs. 170 per khandy.	" 4 times.
5	Chánda ...	0	15	18th June 1906 ...	13th September 1906 ...	219	10·58	White with a reddish tinge and slightly stained. Soft and silky with good but uneven staple. The fibre is strong; value Rs. 245 per khandy.	" "
5	Bani ...	0	20½	14th June 1906 ...	20th August 1906 ...	866	28·61	"Fine" class, white silky and clean, staple good; value Rs. 280 per khandy.	" 3 times.

The yields given are unreliable as the land is of very unequal capacity. It will be seen from the above statement that Bani has yielded well. The growth of this variety was very vigorous and the bolls opened very freely. It is earlier than all the others. The outturn of Cháuda cold weather is very poor; this is due to the lodging of many of the plants owing to the forcing growth caused by the liquid manure from the byres, which the field had received for some time before the crop was sown. The bolls also did not open freely. The yields of Kumpta and Varádi are moderate. The percentage of lint to seed cotton in the case of Goghári is higher than any of the other varieties.

Samples of the above cottons were forwarded to Messrs. Tata and Co., for their opinion and valuation. Their remarks are included in the statement above referred to.

11. A few plants of each of the 25 varieties of American cottons were grown for trial. The following five varieties, *viz.*, (1) Truitt, (2) Whittle, (3) Texas long stapled, (4) Tata's Allen Hybrid, and (5) Doughty, were vigorous in growth and yielded fine big bolls.

12. *Tree Cottons.*—The following varieties of tree cottons, *viz.*, Bourbon, Peruvian, Brazilian (3 varieties), Caravonica, and Tytler's Kidney, have been grown this year on light soil portions of fields Nos. 3 and 4, 4 gunthas being planted to each.

In addition to the above a few plants of each of the varieties of tree cottons from the Central Provinces, Madras, Bengal, Central India, and a few plants of the arboreum type have been planted in portions of the same field.

All the cottons came up well. During the hot season the young plants had to be irrigated to keep them alive.

13. *San and Ambádi*—These were grown for test of comparative fibre.

The following statement shows the percentage of fibre to dry stalks and yield per acre :—

Field No.	Name of crop.	Area.	Per acre.		Percentage of fibre to dry stalk.
			Dry ripe stalks, leaves and seeds removed.	Fibre.	
		Gunthas.	Lbs.	Lbs.	
9	San ...	15	5,619	679	12·09
9	Ambádi ..	20	2,7:6	658	24·15

The San pods were attacked by catterpillars, when they were just forming, hence no San seed was obtained. Ambádi yielded 656 lbs. of seed per acre in addition to the fibre.

VIII.—Varietal Experiments.

14. *Bájri.*—The following three varieties of Bájri were grown for seed with subordinate rows of Tur and castors:—

(1) Awned or bearded Bájri and red Tur of Khándesh.

(2) African Bájri and red Tur from Bellary.

(3) Sindhi Bájri with Peruvian castor.

A plot 20 gunthas was sown with Bájri bearded, with a row of Tur for every second row of Bájri. After the crop attained the height of 15 inches half the portion was 'samáred' as is the practice in Gujarát, the other half was left as it was for comparison. The following statement shows the outturn per acre of the two portions separately:—

Field No.	Name of crop.	Area.	Date of sowing.	Yield per acre.		Remarks.
				Grain.	Fodder.	
		Gts.		lbs.	lbs.	
4	Bájri bearded	10	10th July 1906.	724	4,480	Samáred on 19th August 1906.
4	Do. ...	10	Do. ...	616	4,368	Not samáred.

There is a slight increase in yield in the case of the Samáred portion. The Samáring increases the tillering power of the young plants.

The red Tur of Khándesh was attacked with wilt and only a few plants survived; these yielded only 40 lbs. of the pulse.

15. *African Bájri.*—The ear-heads of this foreign Bájri are long with closely packed white grains on them. It tillers freely but is a very late variety. It was attacked with smut, and only a few sound heads could be found. These have been selected and kept for seed.

The red Tur from Bellary grown with the Bájri was wilted and gave an outturn of 57 lbs. of pulse.

16. *Sindhi Bájri.*—A small quantity of seed of this variety was obtained from the Bombay Exhibition in 1904, and was sown in small plots in 1905 to get sufficient seed for sowing on a larger area. It was sown on a 10-guntha plot this year. It yielded at the rate of 336 lbs. of grain and 2,080 lbs. of straw per acre.

The yield is below the average. This is partly due to smut and partly to a portion of the crop occupying a shady place along the boundary of the field.

The castor grown with this was very irregular in growth and yielded a nominal outturn.

17. *Jowár.*—The variety of Jowár known as Yellow Cholum is grown in Madras for fodder. The seed was obtained from Madras and sown on a 20-guntha plot to get sufficient seed for sowing as a fodder crop in the next year. The seed was sown on the 21st of June. The plants grew well and high, but all the heads were found to be devoid of grain, and light, owing probably to the non-fertilization of the flowers. The stalks were cut down and yielded dry fodder weighing 13,652 lbs. per acre.

18. *Sundhia, Nilva, Utávali and Sorghum.*—These four fodder Jowárs were grown for seed. The following statement gives the per acre results :—

Field No.	Name of crop.	Area.	Yield per acre.		Value of yield per acre.		Cost of cultivation per acre.
			Grain.	Fodder.	Grain.	Fodder.	
		Gts.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
12	Sundhia ...	11	1,116	2,461	55 13 2	12 4 10	28 1 4
...	Nilva ...	11	596	10,167	29 13 2	50 13 4	35 13 7
...	Utávali ...	11	618	7,927	30 10 4	39 10 2	38 9 3
10	Sorghum ...	15	315	11,733	42 0 0	39 1 9	58 8 5

19. *Broom Corn.*—A plot of 10 gunthas was sown with this. The ear heads are developed into a loose panicle, which can be used for making brooms after threshing out the grain. This year the crop was almost a failure owing to the uneven nature of the field; many of the plants became stunted in growth, others getting yellow owing to excess of water in a portion of the field. A few heads have been selected for seed for the next year.

20. *Maize.*—Two varieties of maize, *viz.* (1) Cawnpore, (2) Jawnpore, with white Tur from Bárámati were grown for seed.

Both the varieties are early. The following statement gives the outturn results :—

Field No.	Name of crop.	Area.	Date of sowing.	Date of flowering.	Yield per acre.		Percentage of grain to cobs.
					Grain.	Fodder.	
		Gts.			Lbs.	Lbs.	
10	Cawnpore Maize ..	15	15th June 1906.	22nd July 1906.	2,248	3,125	77
	Jawnpore Maize ...	20	21st June 1906.	2nd August 1906.	672	1,080	66
	Tur Bárámati ...				880	Bhusa 900	

The yield of Jawnpore maize is small owing to the attack of parrots upon the inflorescence which interfered with the proper fertilization of the flowers. The Bárámati Tur has yielded well.

21. *Wheat varieties and crosses.*—The wheat varieties and crosses, grown on the Station in the rabi season of 1905, were sent to the Chamber of Commerce, Bombay, for valuation and opinion. Out of the 113 samples (including varieties and crosses) sent, the following 8 were reported upon as good :—

No.	Name of the Variety.	Class.	Remarks by the Chamber of Commerce.
1	Siah Das ...	Kála kusal ..	Very good superior hard yellow wheat.
2	Australian $\frac{28}{32}$ .. + Australian 27 ...	Australian class.	Very good.
3	Shet Parner .. + Khapli	Cross between Popatia and Khapli.	Hard yellow, containing some proportion of spotted grains, quality good on the whole.
4	Hybrid Nagpore ... + Muzafargarh ..	Inter-cross of Daudkháni.	Soft wheat; had the grains been slightly bolder, the quality would be very good indeed.
5	Australian $\frac{28}{32}$ 22 ...	Australian ...	White moondy very good quality.
6	Paman Sirsa ...	Daudkháni ...	Soft white fairly good.
7	Potia Nadiád ...	Do. ...	Very good soft red.
8	Párner wheat ...	Kála kusal ...	Very good hard yellow.

These eight and a few others selected as (*a*) good yielders, (*b*) showing resistance to rust in 1905-06 were sown in the rabi season of the year under report on a field treated with different green manures. The rest of the varieties and crosses were sown in $\frac{1}{4}$ guntha plots in another field for seed.

The field to be sown with the selected varieties was divided into 5 sections and each was sown with San, Chavli, soybeans, and velvet beans respectively, the last and the 5th section being kept fallow for comparison.

The above crops were ploughed in as they came into flowers.

The following statement shows the dates of sowing and ploughing in of the several crops grown :—

No.	Name of Crop.	Date of Sowing.	Date of ploughing in the crop.	Number of days required.
1	San ...	18th June 1906 ...	2nd, 3rd, August 1906.	46
2	Chavli ...	Do. ...	4th, 5th, 6th, August 1906.	49
3	Soybeans ...	22nd June 1906 ...	28th, 30th July 1906 .	37
4	Velvet beans ...	Do. ...	19th, 21st August 1906.	60

When the field was harrowed on the 25th September for preparing it for sowing no portions of any of the crops, except a few pieces of San stems which could be broken down by the slightest pressure, could be found undecayed. Within about 2 months' time all the crops had thoroughly decayed. In this period of 2 months there were good showers of rain in August and September which helped the process of decay.

Each of the five sections was divided transversely into 23 plots—4 of 8 gunthas each, 12 of 4 gunthas each and seven of 1 guntha each and 23 varieties selected according to the above-mentioned three qualities, were sown in these. Thus, each variety got a treatment of the four green manurial crops and the fallow portion.

The varieties were sown on the 14th and 15th of October 1906. The germination of all was fair. All were irrigated 4 times till they came to maturity.

The statement below shows the yield of the 5 portions separately of each variety on the different green manured and the fallow portion.

Serial No.	Name of Variety.	Results per acre.									
		Green manured with San.		Green manured with Chavli.		Green manured with Soy-beans.		Green manured with Velvet beans.		Fallow.	
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1	Shét Párner + Khapli ...	162	2,361	212	3,250	62	1,256	53	1,503	44	2,250
2	Potia, Nadiád	497	763	512	1,256	481	3,256	534	3,012	600	3,460
3	Kála Kusal (Poona)	400	2,262	575	3,650	587	3,419	550	259	500	2,250
4	Párner Wheat	462	2,237	625	1,898	353	2,250	350	2,084	625	3,016
5	Siah-Das	387	2,012	412	2,875	487	3,050	237	2,231	500	3,0 2
6	Hánsia, Broach	312	3,012	394	4,837	325	4,300	1,531	2,625	775	3,325
7	Deshi, Athni, Belgaum ...	556	1,212	525	1,475	612	1,437	550	1,250	837	1,512
8	Malya, Belgaum	612	2,250	600	2,500	612	2,550	500	1,719	1,000	2,511
9	Mundi of Ludhiana	700	2,600	500	3,087	650	2,444	362	2,800	900	2,531
10	Paman Sirsa	225	1,500	462	2,500	587	4,100	400	2,144	900	4,600
11	Budha Wheat	512	2,537	450	1,950	225	1,275	400	2,187	762	9,012
12	Red Deshi of Oudh	425	2,012	862	3,000	800	2,000	562	2,131	1,900	2,512
13	Safed of Amritsar	531	2,006	500	1,903	525	2,437	500	7,050	1,250	6,250
14	Australian 22 22	650	2,537	1,150	5,270	1,050	4,987	812	3,050	1,150	5,500
15	Hybrid Nágpore + Muzafargarh	600	2,287	550	2,109	650	1,012	600	3,350	1,200	4,937
16	Australian 22 + Australian 27	375	3,100	462	3,537	800	4,957	581	4,512	987	6,100
17	Bansi, Báleghát	200	2,400	300	3,000	650	5,750	450	6,200	900	6,025
18	II Kála Kusal + Khapli ...	800	6,425	400	3,525	800	5,750	750	6,000	750	5,325
19	IIa Do. ...	400	5,150	625	6,550	750	8,150	550	5,650	400	5,850
20	II 3c Khapli + Kála Kusal ...	150	3,200	200	4,000	125	5,000	425	4,437	625	2,825
21	69 Khapli + Hánsia, Broach .	125	3,000	412	5,350	412	5,800	550	6,000	750	7,875
22	71 Do. + Pivla Khándesh.	200	2,400	212	3,200	1,200	1,200	800	9,000	1,200	12,450
23	76 Do. + Sudhe, Ráhuri...	300	4,000	1,200	7,150	1,600	10,000	1,000	6,600	1,200	9,000

All the varieties were very badly rusted and the value and effect of the different green manurial crops are not comparable. The yields of all are below the average.

Khapli, which is said to be rust proof, was also affected with rust. The rust began from the north-west corner of the field, when the grains were first forming and gradually spread all over the field.

IX.—Light Soil Crops and Variety Tests.

22. Five varieties of Soybeans, which had given hopes of proving good yielders at Mánjri in 1904, were grown on a

light soil portion of field No. 6. The crop is an early maturing one, and can be grown successfully as a preparatory for a rabi crop. The many leaves that fall add organic matter to the soil. If sown early in the beginning of June, no irrigation is required. This year the crop was tried as a green manure crop among the different crops tried for that purpose. It comes to maturity very early and can be ploughed up early before the close of the rains so as to get the advantage of the rains for the thorough decay of the crop.

The following statement gives the dates of sowing and flowering of the several varieties and their yield per acre:—

Field No.	Crop.	Area.	Date of Sowing.	Date of flowering.	Date of ripening.	Yield per acre.	Cost of cultivation per acre.
		Gunthas				Lbs.	Rs. a. p.
6	Soybean Variety No. 5 ...	9·4	18th June 1906	10th July 1906 .	15th August 1906.	1,166	34 5 7
6	Do. do. No. 6 ...	7·8	Do. ...	12th do. ..	4th do. ...	513	
6	Do. do. No. 7 ...	8	Do. ...	14th do. ...	14th do. ...	650	
6	Do. do. No. 12 ...	8	Do. ...	Do. do. ...	13th do. ...	575	
6	Do. do. No. 13 ...	15·8	Do. ...	15th do. ...	Do. do. ...	395	

The increased yield in the case of variety No. 5 is due to a portion of the crop bordering upon black soil. The beans can be used for human consumption.

23. *Buck wheat* (*Kuttu*).—This was sown in another light soil portion of the Station in field No. 5. Two varieties of Kuttu seeds were obtained from Kalimpong (Darjeeling). One is called Mitha Paphar and other Titta Paphar. The yield from both the varieties is very low. Starch can be prepared from the seed. The use of the crop is unknown on this side. But at Darjeeling whence the seed was obtained, it is largely used for making bread.

X.—Trial with New Crops.

24. *Jute.*—An area of 10 gunthas was sown with jute on the 2nd of July 1906. On the 3rd day after sowing the seeds germinated. The crop was weeded twice on 20th July and 5th August. The plants were thinned out, and a few were transplanted to fill in the blanks on the 7th of August 1906. The crop was irrigated once in August during long break in the rains. On the 4th of September the crop was cut when in flower. The height of the crop at the time was 4½ feet to 5 feet. The green stems were retted in the river for nine days and the fibre extracted.

The following statement gives the outturn per acre of clean fibre, and the percentage of fibre to green stalks :—

Field No.	Name of crop.	Per acre.		
		Weight of green stalks.	Weight of clean and dried fibre.	Percentage of fibre to green stalks.
		Lbs.	Lbs.	
16	Jute	11,064	272	2·4

The fibre was sent to the Indian Jute Mill Association at Calcutta for valuation. It was valued at Rs. 8-8-0 per maund.

25. *Groundnut.*—Three varieties of groundnuts—Pondicherry, Poona local and Virginia—were grown in field No. 4 away from the Tikka affected field and on areas not sown to groundnuts before.

The disease appeared upon all the varieties, but the attack was very mild, and no serious damage was done to the crop.

The following statement gives the per acre results :—

Field No.	Name of variety.	Area.	Per acre yield.			
			Unhusked nuts.	Haulms.	Cost of cultivation.	Value of outturn.
		Gts.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
4	Pondicherry ..	20	1,800	3,986	101 0 6	116 9 7
4	Poona Local ...	10	948	3,060	81 12 4	67 12 0
4	Virginia ...	20	2,016	1,692	96 13 8	112 1 4

The unevenness of the field has to a certain extent influenced the yield, there being great difficulty in distributing water regularly.

26. *Variegated Bangalore Tur.*—Like other varieties of Tur, a few plants of this variety also had become wilted. It gave an outturn of 595 lbs. of grain and 844 lbs. of Bhusa per acre. Owing to natural cross fertilization, which is so very common in Tur, the colour of the seeds has changed.

XI.—Botanical Experiments.

27. A portion of field No. 9 was devoted to the growing of pulses and millets for botanical classification by the Economic Botanist.

The plot was divided into 179 small plots of the dimensions of 10′×20′ each. Out of the 179 plots 63 were sown with pulses and millets collected at the agricultural show held at Ahmednagar in 1905. Eighty-seven were sown with the following varieties: 16 varieties of Tur, 2 varieties of Kulthi, 4 varieties of Guvár, 7 of Mug, one variety of Matki, 6 varieties of Udid, 29 varieties of Chavli, 2 Nágli varieties, one variety of each of Banti, Barti, Chino, Dhengli, Káng, Bhádli and Kodra, 6 varieties of Vari, 3 of Rála, and 4 of Sáva. The remaining 29 were sown with the varieties of Soybeans, Lima beans and peas.

XII.—Forage Crops.

28. The statement below gives the yields per acre of the Guinea grass in various fields:—

Field No.	Name of crop.	Results per acre.									Remarks.
		Outturn.	Value of outturn.			Cost of cultivation.					
1	2	3	4			5					6
		lbs.	Rs.	a.	p.	Rs.	a.	p.			
1	Guinea grass.	21,152	105	15	4	67	8	4			
2	Do. ...	11,736	58	12	0	34	14	0			
3	Do. ...	17,342	86	11	4	38	9	0			
4	Do. ...	3,144	15	12	0	62	1	0			Plantation started this year.
6	Do. ...	6,217	31	0	3	79	3	11			Do. do.
7	Do. ...	13,129	65	10	4	38	14	0			
9	Do. ...	6,462	32	5	0	73	6	9			Plantation started this year.
10	Do. ...	13,815	69	1	2	35	5	7			
15	Do. ...	16,223	81	1	10	38	2	0			
16	Do. ...	1,470	7	5	7	61	2	4			Plantation started this year.
	Average ...	11,062	55	5	4	52	14	8			
8	Water grass.	31,660	15	13	3	57	14	8			Very old plantation.

A portion of about 20 gunthas of the plantation of this grass has been removed from field No. 10 as this field has been under guinea grass for a long time.

Field No. 13 was formed into a rice field by putting dykes after removing the guinea grass plantation. Border portions of fields Nos. 4, 6, 9, 16 situated under a shade have been planted with this grass this year. The average per acre 11,062 lbs. has slightly increased over that of the last year.

XIII.—Miscellaneous.

29. Three rabi pulses—Lang, gram and Masur—were grown after fodder Jowárs as a rotation crop. The pulses were grown solely under irrigation.

The following statement shows the yield, etc., per acre :—

Field No.	Name of crop.	Area.	Per acre.			
			Grain.	Bhusa.	Cost of cultivation.	Value of outturn.
		Gunthas.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
12	Lang	11	869	1,447	26 15 0	38 10 1
12	Gram, Kábuli	11	507	618	...	33 14 11
12	Masur	11	309	636	...	24 13 5

XIV.—Ensilage.

30. A pit of the dimension of 10′ × 10′ × 10′ was dug in the Ganeshkhind Botanical Gardens for a silo. It was filled with 26,821 lbs. of green grass from the gardens in September last. It was then pressed down with a layer of earth 2 feet thick. The silo was opened in May when there was deficiency of green fodder for the Dairy animals and they ate it readily. The grass was found to be shrunk to 6 feet. The colour of the silage was greenish-brown. From the total quantity of 26,821 lbs. of grass put 16,876 lbs. of silage was obtained. The silage has been sent to the Agricultural Chemist, Bombay Presidency, for analysis.

F. FLETCHER,
Ag. Professor of Agriculture.

Poona,
September 1907.

II.—THE KIRKEE CIVIL DAIRY, 1906-07.

I.—Introduction.

The objects of the Dairy are :—

(1) To afford instructions for the students of the College of Agriculture.

(2) To serve as a model Dairy to the public.

(3) To give opportunity for experiments in feeding and dairying.

(4) To improve dairy breeds.

(5) To supply pure milk to the invalids and children of Poona.

(6) To allow owners of milch cattle the free services of good bulls.

II.—Health of animals.

2. The Dairy was seriously handicapped in this year's work owing to outbreaks of two contagious diseases, *viz.* foot-and-mouth disease and rinderpest. No animals were lost from the former, but their milk yields were appreciably reduced.

Rinderpest was very common in the district and as a precautionary measure the entire herd was inoculated in November and again in January. The disease made its first appearance in the herd in February and a third inoculation was performed. But even in spite of the three inoculations 18 animals were attacked and 10 succumbed to this deadly disease. Among the cattle kept at Mánjri Kuran, which had also undergone two inoculations, there were 34 attacks but the mortality was less as only 4 died.

Rinderpest was more fatal in the case of Australian animals, English-Indian hybrids and Adens. Only one Gir was attacked. Among the second class was the hybrid short-horn Aden known as Harishi whose milk record for previous 4 years averaged nearly 5,000 lbs. The Dairy has two heifers and a bull out of her. The Aden herd was reduced to two bulls, one cow and a calf; but two more have been purchased recently.

Twelve buffaloes aborted soon after the casting for inoculation, rendering them useless for the season.

III.—Milk Supply.

3. The milk supply was greatly affected as shown above.

220,572 lbs. of milk were produced during the year. The Sassoon Hospital contract was continued. No branch dairy was established at Mahábaleshvar, but all milk was sold in Poona and Kirkee, and no Ghee was made.

Some cows have been selected to furnish milk suitable for infants. These animals are always those that have freshened within five months. They are never fed with oil-cake, cotton seed, or green food, and are never allowed to graze. The demand for this special milk is increasing.

IV.—Yield.

4. The largest yields for the year under report are as follows :—

Among cows, the first in yield for the year, now that Harishi, the cross bred English-Aden has died, is Pitámbari (Sindhi) 4,430 lbs., second Bulákhi (Sindhi) 3,778 lbs., third Shendi (Sindhi cross) 3,750 lbs, fourth Bhavali (Gir) 3,712 lbs., fifth Yeshi (Sindhi cross) 3,571 lbs., and sixth Budhi (Gir) 3,552 lbs.

Among buffaloes, Ratan (Jafferabadi) 4,815 lbs., Káveri (Surati) 4,504 lbs., Sálu (Dehli) 3,147 lbs., Ganga (Surati) 3,033 lbs., and Nándi (Deccani) 2,798 lbs.

The usual milk record is given below with the necessary explanatory notes.

No.	Names.	Age.	Total number of years under observation.	Results during the period shown in			
				Total number of days in milk.	Total dry days.	Average of Maximum daily yield.	Average daily yield.
1	2	3	4	5	6	7	8
	Cows I.	Y. m. d.				Lbs. oz.	Lbs. oz.
	Adens.						
1	Bakuli ...	8 1 10	$3\frac{1}{12}$	1,044	81	16 4	7 12
2	Bhági ...	Aged ...	8	2,231	680	15 4	10 5
3	Gulábi ...	4 8 29	$1\frac{1}{2}$	328	86	8 13	5 7
4	Mádi ...	7 0 8	$3\frac{1}{6}$	724	299	7 12	7 6
5	Nári ...	10 9 11	7	1,805	710	15 0	10 1
6	Harishi (cross) ...	Medium ...	5	1,202	600	27 6	15 6
7	Shiti ...	3 8 11	...	129	...	13 4	9 9
	Sindhi.						
1	Ámbi ...	6 4 20	$1\frac{1}{4}$	388	70	13 9	9 1
2	Annapurna ...	7 3 25	3	765	330	10 1	6 3
3	Bhasmi ...	10 11 22	7	1,481	1,074	14 9	8 12
4	Bulákhi ...	3 9 16	$1\frac{1}{2}$	445	...	15 13	10 13
5	Giti ...	3 3 19	$1\frac{1}{6}$	389	17	16 7	9 1
6	Houshi ...	Medium ...	5	1,761	64	14 10	9 12
7	Kánái ...	Do. ...	5	1,368	417	12 14	8 3
8	Kesar ...	Young ...	$3\frac{1}{4}$	718	467	11 5	6 7
9	Khilári ...	4 4 4	$1\frac{1}{4}$	426	35	12 5	9 5
10	Láhiri ...	Medium ...	5	1,338	487	15 14	8 4
11	Makhmal ...	Do. ...	5	1,235	590	11 10	7 3
12	Mhátári ...	Aged ...	5	1,285	544	11 13	7 3
13	Mori ...	Medium ...	5	1,528	297	14 13	8 9
14	Mutri ...	6 8 18	$2\frac{3}{4}$	865	124	11 7	8 2
15	Pári ...	Medium ...	7	1,887	718	14 8	8 14
16	Piri ..	11 2 29	8	2,273	647	13 12	8 15
17	Pitámbari ...	11 7 18	8	2,558	362	16 14	10 5
18	Polári ...	Medium ...	7	1,640	915	16 9	9 3
19	Putali ...	Do. ...	7	1,575	976	14 11	8 5
20	Rádhi ...	Do. ...	5	1,394	427	13 3	8 13
21	Hira ...	Do. ...	$4\frac{1}{3}$	1,293	373	13 8	7 10
22	Dabi ...	7 2 7	$2\frac{5}{6}$	382	654	11 13	7 0
23	Sábani ...	Medium ...	8	1,720	1,200	13 8	9 3
24	Samarthi ...	14 0 0	8	2,095	825	11 3	6 13
25	Soni ...	4 2 22	$1\frac{1}{2}$	406	52	...	...
26	Sukhi ...	7 10 4	$3\frac{1}{6}$	1,149	251	12 3	7 13
27	Támbhori ...	7 10 4	5	1,388	434	12 14	8 6
28	Tufáni ...	Medium ...	$4\frac{5}{6}$	986	778	14 3	9 6
29	Zankár ...	Do. ...	5	1,504	321	18 2	11 9
30	Mohan ...	4 2 27	...	8	...	11 0	...
	Sindhi-Cross.						
1	Kara .	9 8 10	6	1.367	823	15 1	10 2
2	Mekini ...	Medium ...	8	2,204	704	16 0	10 11
3	Mungli ..	5 2 3	$1\frac{1}{4}$	444	...	16 4	10 0

column 4.		Financial results for total period shown in column 4.																
Yearly average out-put.	Yield of milk during 1906-07.	Value of milk.			Cost of feeding.			Cost of attendance.			Net profit.			Average net profit per year.	Remarks.
9	10	11			12			13			14			15	16
Lbs.	Lbs. oz.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	
2,641	2,849 8	685	0	0	341	0	0	53	0	0	291	0	0	94	Died.
2,885	3,273 8	2,013	0	0	736	0	0	304	0	0	973	0	0	121	
1,588	1,477 12	154	0	0	80	0	0	13	0	0	61	0	0	52	Died.
1,695	406 8	469	0	0	252	0	0	45	0	0	172	0	0	49	Do.
2,604	2,793 0	1,629	0	0	603	0	0	252	0	0	775	0	0	110	Do.
3,726	3,444 8	1,629	0	0	579	0	0	153	0	0	897	0	0	179	Do.
...	1,240 0	103	5	4	81	0	7	9	4	3	13	0	6	...	New.
2,828	2,411 0	294	0	0	129	0	0	22	0	0	143	0	0	114	
1,591	2,028 4	394	0	0	214	0	0	39	0	0	141	0	0	48	
1,861	587 12	1,178	0	0	693	0	0	230	0	0	255	0	0	98	
3,857	3,778 12	402	0	0	125	0	0	31	0	0	246	0	0	197	
3,026	3,095 8	294	0	0	115	0	0	25	0	0	154	0	0	132	
3,451	3,383 0	1,573	0	0	504	0	0	154	0	0	715	0	0	183	
2,255	1,486 4	1,032	0	0	445	0	0	138	0	0	449	0	0	89	
1,425	1,333 8	442	0	0	265	0	0	30	0	0	147	0	0	75	Sold.
3,181	2,904 0	332	0	0	117	0	0	26	0	0	189	0	0	151	
2,217	3,364 8	982	0	0	300	0	0	152	0	0	530	0	0	105	
1,776	1,242 4	807	0	0	352	0	0	136	0	0	319	0	0	64	
1,854	235 4	850	0	0	301	0	0	130	0	0	419	0	0	83	
2,632	2,943 4	1,177	0	0	497	0	0	153	0	0	527	0	0	113	
2,560	3,109 8	566	0	0	186	0	0	44	0	0	336	0	0	119	
2,341	2,172 8	1,472	0	0	564	0	0	242	0	0	666	0	0	95	
2,542	3,305 0	1,844	0	0	676	0	0	302	0	0	866	0	0	108	
3,307	4,430 0	2,295	0	0	878	0	0	314	0	0	1,103	0	0	153	
2,166	2,209 8	1,335	0	0	552	0	0	244	0	0	539	0	0	77	
1,871	1,690 12	1,153	9	0	520	0	0	231	0	0	402	0	0	57	
2,467	2,015 12	1,119	0	0	440	0	0	141	0	0	538	0	0	107	
2,144	565 4	845	0	0	482	0	0	135	0	0	228	0	0	52	Sold.
949	982 8	224	0	6	134	0	0	18	0	0	72	0	0	24	Do.
1,982	40 8	1,388	0	0	717	0	0	280	0	0	391	0	0	88	Died.
1,787	1,047 12	1,242	0	0	621	0	0	287	0	0	334	0	0	41	
...	2,290 0	279	0	0	115	0	0	21	0	0	143	0	0	114	
2,351	3,344 8	754	0	0	257	0	0	62	0	0	435	0	0	113	
2,341	2,512 0	1,047	0	0	431	0	0	148	0	0	468	0	0	94	
1,922	2,326 8	836	0	0	315	0	0	117	0	0	404	0	0	79	Sold.
3,476	3,059 8	1,549	0	0	501	0	0	153	0	0	895	0	0	185	
...	52 8	4	6	0	1	11	3	0	6	2	2	4	7	...	New.
2,312	2,910 8	1,234	0	0	571	0	0	197	0	0	466	0	0	77	
2,949	2,453 8	2,013	0	0	784	0	0	293	0	0	966	0	0	120	Died.
3,560	3,515 12	371	0	0	136	0	0	18	0	0	217	0	0	173	

No.	Name.	Age.	Total number of years under observation.	Results during the period shown in			
				Total number of days in milk.	Total dry days.	Average of Maximum daily yield.	Average daily yield.
1	2	3	4	5	6	7	8
	Cows I—*contd.*	Y. m. d.				Lbs. oz.	Lbs. oz.
	Sindhi-Cross—*continued.*						
4	Sáraji ...	14 9 10	8	2,487	433	13 14	7 3
5	Shendi ...	6 3 19	1½	477	...	16 3	11 2
6	Tiki ...	Young ...	5	1,524	298	13 10	7 15
7	Yeshi ...	Do. ...	2 11/12	1,008	57	17 15	9 10
8	Sárangi ...	7 6 20	2 11/12	851	214	14 9	5 15
	Gir.						
1	Bhavali ...	Young ...	2¼	520	301	17 12	12 5
2	Bhudhi ...	Do. ...	2¼	527	290	15 2	9 14
3	Godi ...	Medium ...	3½	1,034	121	15 5	8 5
4	Kábari ...	Young ...	2¼	393	433	12 0	6 11
5	Kamali ...	Do. ...	2 5/12	591	301	11 14	7 5
6	Lábiri ...	Do. ...	2 5/12	761	131	15 2	9 7
7	Lingádi ...	Medium ...	2 5/12	393	499	9 13	5 12
8	Mukharan ...	Do. ...	2 1/12	518	247	18 10	9 2
9	Narbadi ...	Do. ...	2½	409	332	13 3	7 2
10	Pavali ...	Do. ...	2 5/12	521	372	14 7	7 9
11	Sugaran ...	Do. ...	2½	307	544	8 8	5 6
12	Umbari ...	Aged ...	2 1/12	424	126	13 0	8 6
13	Kájali ...	Young ...	...	263	...	11 4	...
14	Mahéli ...	Do. ...	...	273	...	13 8	...
15	Tápi ...	Do. ...	1½	190	345	10 8	5 12
	Gir-Cross.						
1	Bigul ...	Medium ...	8	2,308	608	13 5	8 4
2	Pándhari ...	Do. ...	1¼	229	220	3 4	4 12

NOTE.—The average yearly yield per cow comes to 2,101 lbs.; the average daily yield 7 lbs. 8 oz.; the average cost of feeding the cow Rs. 95-15-1, and the average net profit per cow Rs. 67-7-10.

Column 7.—The maximum day's yield of the year is always quoted at a sale as an indication of an animal's productiveness and the average of these record yields for the whole period of observation is here given as affording a fair basis for comparison between the various animals when in milk.

Column 8—Gives the average for the whole period inclusive of days dry.

Column 11.—The price of milk has varied for customers from 10 to 14 lbs. per rupee, but an attempt has been made to fix a slightly higher arbitrary figure to cover cost of distribution. It must however be remembered that these statements are only intended to afford a basis for comparison between animals and the figures do not give an accurate indication of the total profit or loss. Sales of dairy produce in the shape of Ghee and sometimes butter when the demand for milk is very small are generally unprofitable, and and in such cases the price estimated for milk is not realised in practice. Charges for supervision, etc., are also not taken into account is estimating these comparative net profits per animal.

column 4.		Financial results for total period shown in column 4.					
Yearly average out-put.	Yield of milk during 1906-07.	Value of milk.	Cost of feeding.	Cost of attendance.	Net profit.	Average net profit per year.	Remarks.
9	10	11	12	13	14	15	16
Lbs.	Lbs. oz.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs.	
2,246	1,799 8	1,565 0 0	628 0 0	294 0 0	690 0 0	50	Died.
3,980	3,750 0	442 0 0	117 0 0	32 0 0	293 0 0	220	
2,416	2,204 4	1,089 0 0	396 0 0	147 0 0	546 0 0	108	Died.
3,323	3,571 4	838 0 0	287 0 0	57 0 0	494 0 0	169	
1,737	144 8	471 0 0	223 0 0	42 0 0	181 0 0	71	Died.
2,855	3,712 0	535 0 0	181 0 0	35 0 0	319 0 0	146	
2,318	3,552 12	435 0 0	191 0 0	34 0 0	210 0 0	82	
2,714	1,959 12	774 0 0	297 0 0	48 0 0	429 0 0	135	
1,174	1,066 4	220 0 0	158 0 0	16 0 0	46 0 0	20	Sold.
1,800	1,162 8	362 0 0	203 0 0	27 0 0	142 0 0	54	
2,982	2,175 12	601 0 0	232 0 0	39 0 0	330 0 0	136	
935	1,580 8	187 0 0	135 0 0	20 0 0	32 0 0	13	Sold.
2,274	2,189 12	394 0 0	159 0 0	29 0 0	206 0 0	98	
1,166	1,446 0	221 0 0	144 0 0	21 0 0	56 0 0	24	
1,639	1,915 8	330 0 0	172 0 0	24 0 0	134 0 0	54	
708	53 4	137 0 0	134 0 0	12 0 0	.....	—30	Loss.
1,707	2,070 4	297 0 0	147 0 0	20 0 0	130 0 0	61	
...	1,997 0	166 0 0	129 0 0	14 0 0	23 0 0	...	New.
...	2,794 0	233 0 0	109 0 0	21 0 0	103 0 0	...	Do.
729	...	72 0 0	67 0 0	8 0 0	—3 0 0	3	Sold.
2,394	3,128 12	1,645 0 0	663 0 0	302 0 0	680 0 0	85	
869	...	82 0 0	45 0 0	12 0 0	25 0 0	28	Sold.

Column 12.—These figures are actuals. It may be noted that cost of feeding and attendance varies with different animals according to period of lactation, size, yield of milk and individual idiosyncrasies.

Column 13.—These figures are actuals for the last three years and approximate estimates for preceding years.

No.	Names.	Age.	Total number of years under observation.	Results during the period shown in			
				Total number of days in milk.	Total dry days.	Average of Maximum daily yield.	Average daily yield.
1	2	3	4	5	6	7	8
	Buffaloes II.	Y. m. d.				Lbs. oz.	Lbs. oz.
	Jaffarabadi.						
1	Kundal ...	Medium ..	4	889	571	17 5	11 2
2	Ratan ...	Do. ...	4	1,076	380	23 0	14 11
3	Sardári ...	Do. ..	2 5/12	709	182	22 2	14 5
4	Makna ...	Do. ...	1 1/4	349	195	18 0	8 5
	Delhi.						
1	Mahálan ...	Aged ...	7 1/3	1,773	903	29 9	15 14
2	Rambha ...	13 11 19	8	1,839	1,081	13 4	9 2
3	Sálu ...	Medium ...	2 1/3	600	245	17 12	12 13
4	Sávali ...	Do. ...	2 11/12	469	486	10 14	8 14
5	Godi (cross) ...	Young ...	5/12	145	...	15 0	...
	Surati.						
1	Aditwári ..	Medium ...	2 1/12	599	352	12 6	7 0
2	Bárshi ...	Do. ...	4	1,021	489	16 15	11 0
3	Báyaja ...	15 6 24	8	2,046	874	14 12	8 13
4	Bhandári ...	Aged ...	3 11/12	1,022	379	15 4	7 13
5	Bhavari ...	Medium ...	2 1/12	685	270	14 1	7 10
6	Bhori ..	Aged ...	8	2,329	591	15 6	10 8
7	Chhabeli ...	14 9 11	8	2,195	755	16 12	11 13
8	Chándani ...	Aged ...	4	645	815	13 8	7 5
9	Dalbhári ...	14 4 9	7 5/6	1,934	896	14 14	10 4
10	Durga ...	Young ...	4	947	513	13 7	8 5
11	Gahina ...	Medium ...	2 1/12	595	175	16 10	10 8
12	Gajari ...	Aged ...	8	1,920	996	16 15	10 8
13	Ganga ...	Do. ...	8	2,052	868	17 8	12 14
14	Ghári ...	Medium ..	8	2,051	865	17 4	12 5
15	Ghosáli ...	Young ...	2 7/12	765	190	12 3	7 15
16	Ghumbári ...	Medium ...	2 7/12	629	326	11 4	8 6
17	Girji ...	Do. ...	2 7/12	654	291	15 6	9 10
18	Gujar ...	Aged ...	8	1,838	1,078	18 8½	8 6
19	Jamádár ...	14 3 27	8	1,965	951	15 9¾	10 0
20	Káveri ...	14 3 17	8	2,221	695	19 7	12 7
21	Maini ...	Young ...	1 5/12	436	102	11 4	5 11
22	Mangi ...	13 8 18	6 1/3	1,364	501	12 7	8 12
23	Mori ...	Medium ...	2 7/12	787	164	14 15	9 8
24	Paroli ...	Do. ...	8	1,999	911	14 14	8 8
25	Patangi ...	Young ...	2 7/12	657	288	19 6	14 14
26	Putali ...	Aged ...	7	1,672	879	12 4	9 15
27	Ranga ...	Medium ...	5	999	822	17 12	11 0
28	Rupi ...	Young ...	2 7/12	719	376	13 3	9 15
29	Shevri ...	Medium ...	4	952	558	16 10¼	9 8
30	Tavali ...	Young ...	2 3/4	786	216	16 13	10 9
31	Sajani ...	.....	...	163	202	18 8	...

column 4.		Financial results for total period shown in column 4.													
Yearly average out-put.	Yield of milk during 1906-07.	Value of milk.			Cost of feeding.			Cost of attendance.			Net profit.			Average net profit per year.	Remarks.
9	10	11			12			13			14			15	16
Lbs.	Lbs. oz.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	
2,474	2,235 8	807	0	0	351	0	0	93	0	0	363	0	0	90	
3,966	4,815 0	1,289	0	0	309	0	0	114	0	0	866	0	0	216	
4,236	2,617 4	858	0	0	246	0	0	42	0	0	565	0	0	234	
1,942	268 4	243	0	0	324	0	0	16	0	0	—97	0	0	—118	Died.
3,883	1,707 0	2,187	0	0	845	0	0	281	0	0	1,061	0	0	149	Died.
2,107	1,600 4	1,309	0	0	714	0	0	288	0	0	307	0	0	37	
3,292	3,147 8	640	0	0	218	0	0	40	0	0	382	0	0	168	
1,433	...	190	0	0	147	0	0	20	0	0	23	0	0	12	Sold.
...	1,466 12	122	0	0	120	0	0	11	0	0	—9	0	0	...	New.
2,021	356 8	435	0	0	196	0	0	27	0	0	212	0	0	87	
2,818	2,606 12	912	0	0	366	0	0	95	0	0	451	0	0	112	
2,257	2,036 0	1,410	0	0	788	0	0	282	0	0	340	0	0	44	
2,046	850 0	613	0	0	318	0	0	88	0	0	237	0	0	59	Died.
2,512	2,346 0	540	0	0	226	0	0	38	0	0	176	0	0	107	
3,071	1,899 0	1,906	0	0	924	0	0	291	0	0	691	0	0	86	
3,245	2,207 0	2,054	0	0	875	0	0	293	0	0	886	0	0	112	
1,180	280 8	384	0	0	244	0	0	75	0	0	65	0	0	16	
2,533	743 0	1,541	0	0	727	0	0	283	0	0	531	0	0	68	
1,974	1,531 12	641	0	0	346	0	0	87	0	0	208	0	0	52	
3,000	2,177 4	520	0	0	224	0	0	34	0	0	262	0	0	125	
2,531	413 8	1,579	0	0	778	0	0	284	0	0	577	0	0	73	
3,314	3,033 4	2,084	0	0	882	0	0	300	0	0	902	0	0	113	
3,157	2,821 12	1,981	0	0	847	0	0	302	0	0	832	0	0	103	
2,354	1,365 4	507	0	0	243	0	0	31	0	0	233	0	0	90	
2,038	670 4	439	0	0	261	0	0	26	0	0	152	0	0	58	
2,452	2,095 0	528	0	0	222	0	0	35	0	0	271	0	0	106	
1,926	269 0	1,194	0	0	688	0	0	282	0	0	224	0	0	28	
2,468	2,271 0	1,553	0	0	757	0	0	297	0	0	499	0	0	62	
3,458	4,504 12	2,179	0	0	908	0	0	311	0	0	960	0	0	119	
1,763	1,147 12	208	0	0	145	0	0	16	0	0	47	0	0	33	
1,753	1,135 0	977	0	0	574	0	0	229	0	0	174	0	0	256	Died.
2,910	2,577 8	626	0	0	226	0	0	40	0	0	360	0	0	107	
2,132	1,812 12	1,339	0	0	729	0	0	290	0	0	320	0	0	39	
3,294	2,481 4	709	0	0	240	0	0	38	0	0	431	0	0	112	
2,374	1,220 4	1,256	0	0	661	0	0	240	0	0	355	0	0	51	
2,208	675 4	892	0	0	478	0	0	136	0	0	278	0	0	55	
2,779	2,900 8	599	0	0	220	0	0	42	0	0	337	0	0	130	
2,268	2,881 0	736	0	0	325	0	0	99	0	0	312	0	0	78	
3,024	2,188 12	692	0	0	249	0	0	38	0	0	405	0	0	147	
...	2,284 0	190	0	0	110	0	0	17	0	0	63	0	0	...	New.

No.	Names.	Age.	Total number of years under observation.	Results during the period shown in			
				Total number of days in milk.	Total dry days.	Average of Maximum daily yield.	Average daily yield.
1	2	3	4	5	6	7	8
	Buffaloes II *—continued.*	Y. m. d.				Lbs. oz.	Lbs. oz.
	Deccani.						
1	Ghevada ...	Medium ...	1	238	66	11 12	...
2	Kevada ...	Do. ...	1	230	74	10 0	...
3	Chandri ...	Aged ...	1	262	42	13 12	...
4	Rumáli ...	Do. ...	1	206	98	10 0	...
5	Hira ...	Medium ...	1	244	60	9 8	...
6	Hangámi ...	Do. ...	1	245	59	7 12	...
7	Nándi ...	Young ...	1	304	...	13 4	...
8	Gharol ...	Do. ...	1	238	66	13 4	...

NOTE.—The average yearly yield per buffalo comes to 1,887 lbs.; the average daily yield 8 lbs. 2 oz. and the average cost of feeding the buffalo Rs. 95-13-10, and average net profit per buffalo Rs. 49-8-0.

Column 7.—The maximum day's yield of the year is always quoted at a sale as an indication of an animal's productiveness and the average of these record yields for the whole period of observation is here given as affording a fair basis for comparison between the various animals when in milk.

Column 8—Gives the average for the whole period inclusive of days dry.

Column 11.—The price of milk has varied for customers from 10 to 14 lbs. per rupee, but an attempt has been made to fix a slightly higher arbitrary figure to cover cost of distribution. It must however be remembered that these statements are only intended to afford a basis for comparison between animals and the figures do not give an accurate indication of the total profit or loss. Sales of dairy produce in the shape of Ghee and sometimes butter when the demand for milk is very small are generally unprofitable, and in such cases the price estimated for milk is not realised in practice. Charges for supervision, etc., are also not taken into account in estimating these comparative net profits per animal.

Column 12.—These figures are actuals. It may be noted that cost of feeding and attendance varies with different animals according to period of lactation, size, yield of milk and individual idiosyncrasies.

Column 13.—These figures are actuals for the last three years and approximate estimates for preceding years.

column 4.		Financial results for total period shown in column 4.					
Yearly average out-put.	Yield of milk during 1906-07.	Value of milk.	Cost of feeding.	Cost of attendance.	Net profit.	Average net profit per year.	Remarks.
9	10	11	12	13	14	15	16
Lbs.	Lbs. oz.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs.	
...	1,865 0	155 0 0	97 0 0	13 0 0	45 0 0	...	Bought this year.
...	1,517 0	126 0 0	105 0 0	11 0 0	10 0 0	...	
...	2,432 0	203 0 0	97 0 0	18 0 0	88 0 0	...	
...	1,733 8	144 0 0	93 0 0	13 0 0	38 0 0	...	
...	1,168 0	97 0 0	92 0 0	9 0 0	4 0 0	...	
...	1,499 8	125 0 0	96 0 0	11 0 0	18 0 0	...	
...	2,798 8	233 0 0	110 0 0	21 0 0	102 0 0	...	
...	1,958 8	163 0 0	94 0 0	15 0 0	54 0 0	...	

V.—Strength of the Herd.

5. The following statement shows the strength of the herd on the 1st of April 1907 as compared with that on the 1st of April 1906:—

Description.	Strength on 1st April 1906.	Increase.			Decrease.				Strength on 1st April 1907.	Valuation.		Increase or decrease during the year.
		Purchased or Transferred.	Born.	Total.	Sold.	Died.	Transferred.	Total.		1906.	1907	
Cows.												
Shed-bulls... ...	11	2	...	2	3	...	...	3	10	660	620	—40
Cows	60	2	...	2	8	10	...	18	44	3,305	2,415	—890
Heifers	3	3	...	3	1	...	2	3	3	55	90	+35
Cow-calves ...	32	...	20	20	22	7	3	32	20	295	212	—83
Bull-calves ...	34	...	24	24	30	11	2	43	15	211	172	—39
Total ...	140	7	44	51	64	28	7	99	92	4,526	3,509	—1,017
Buffaloes.												
Buffalo-bulls ...	5	1	...	1	...	...	...	...	6	260	340	+80
She-buffaloes ...	38	10	...	10	1	5	...	6	42	2,875	1,565	—1,310
Heifers	5	1	...	1	...	...	2	2	4	165	135	—30
Buffalo-cow-calves	26	4	13	17	13	18	1	32	11	126	107	—19
Do. bull-calves	17	...	10	12	9	14	1	24	5	37	22	—15
Total ...	91	16	23	41	23	37	4	64	68	3,463	2,169	—1,294
Dairy cart horses .	2	...	...	...	...	...	...	...	2	300	250	—50

From the above statement it will be seen that there is a decrease of 71 in the total number which is principally due to the fact that on account of low prices the casters of the previous years were held over and disposed of this year.

VI.—Breeds kept.

6. Three breeds of cows—Karáchi or Sindhi, Aden, and Gir—and four of buffaloes,—Jaffarabadi, Dehli, Kaira or Surati, and Varádi or Deccani—are kept.

As already stated the Adens were nearly wiped out by the rinderpest. The present Gir herd has only had three seasons at the dairy; it contains some good cows but they have not been in the dairy long enough to have off-spring in milk.

Very little has been done in breeding of buffaloes at Poona as only the Deccanis really do well here as youngsters; but the

Dairy has some good representative animals of Jafferabadi, Surati, Dehli and Deccani. A few fine females of the Deccani breed have been obtained and they will be crossed with a Kaira bull.

The Sindhi cows have been bred continuously for about 11 years and we now have 29 farm bred heifers and cows; of these, 17 are in milk. Pitámbari (3,307 lbs. average for eight years) out of Jánki (record 3,481 lbs. of milk) stands first. Bulákhi as a three year old gave over 4,000 lbs. and had her second calf without going dry a day, Giti with 3,400 lbs. as three years old, are some of the most promising.

The four breeding Sindhi bulls are:—Daulat, bought in Sind; Battáshia out of the cow Battáshi (daily yield of 22-8 lbs. and a record of 2,871 lbs. in 333 days,) sired by Mansur, bought in Sind; Rája out of Devri (daily yield 19-12 lbs., 4,705 lbs. in 420 days,) Sire Mansur; and Bansia out of Houshi (average for 5 years 3,451 lbs.,) sired by Battáshia.

VII.—Service of bulls.

7. Free service of bulls is given to the public for healthy animals.

VIII.—Farm.

8.. No feeding experiments were carried out in the year under report. Fodder was grown on the Agricultural College lands and the usual statement is appended. The total area cropped was 75 acres and 33 gunthas. The details ore given in the following statement:—

Survey No.	Plot	Kharif crop.	Area.	Purpose.	Rabi crop.	Area.	Purpose.	Remarks.
			A. g.			A. g.		
137	1	Bájri and Chavli mixed.	2 0	Green fodder.	Bájri ratoon.	2 0	Green fodder.	
...	2	Do. ...	2 0	Do. ...	...	...	.....	
...	3	Do. ...	2 0	Do. ...	...	...	.....	
...	4	Do. ...	2 0	Dry fodder .	...	...	.....	
150	3	Nilva ...	2 8	Green fodder.	...	...	.....	
151	2	Do. ...	7 18	Do ...	...	...	.....	
152 } 258 }	2	Sundhia ...	0 35	Dry fodder .	...	...	.....	
153	1	Hundi Ratoon	2 20	Green fodder.	Hundi ...	2 20	Green fodder.	Hundi was sown in March and the Ratoon crop was taken in kharif, hence shown under kharif.

Survey No.	Plot	Kharif crop.	Area.	Purpose.	Rabi crop.	Area.	Purpose.	Remarks.
			A. g.			A. g.		
...	1	.....	...	.....	Maize ...	0 5	Green fodder.	
...	2	Hundi Ratoon	2 30	Green fodder.	Hundi ...	2 30	Do. ...	Hundi was sown in March and the Ratoon crop was taken in kharif, hence shown under kharif.
...	2	.....	...	.....	Maize ...	2 30	Do. ...	
...	3	.....	...	.....	Do. ...	0 34	Do. ...	
...	4	Lucerne ...	0 17	Green fodder. Perennial	...	...	.....	
...	5	Hundi Ratoon	2 20	Green fodder.	Hundi ...	2 20	Green fodder.	Do.
...	5	.....	...	.....	Peas&Oats	1 34	Do. ...	
...	6	Sorghum ...	0 38	Green fodder.	Shálu ...	0 38	Do. ...	
...	7	Utávali ...	1 2	Do. ...	Maize ...	1 26	Do. ...	
...	8	Sundhia ...	2 20	Dry fodder...	Do. ...	2 20	Do. ...	
...	9	Maize ...	1 8	Green fodder.	...	...	.....	
...	10	Lucerne ...	1 2	Green fodder. Perennial.	...	...	.....	
...	11	Sundhia ...	3 20	Green fodder.	Maize ...	3 20	Green fodder.	
154	2	Utávali ...	1 4	Do. ...	...	...	.....	
...	3	.....	...	.....	Khapli ...	2 10	Greenfodder.	
156	1	Nilva ...	4 33	Green fodder.	...	...	.....	
157	1	Utávali ...	1 23	Do. ...	Peas&Oats	1 23	Green fodder.	
158	1	Sundhia ..	4 0	Do. ...	...	...	.....	
...	2	Bájri ...	0 15	Do. ...	...	...	.....	
...	3	Mixed Jowár.	0 10	Do. ...	...	...	.....	

IX.—Fodder Crops.

9. The following statement gives the outturn, cost of cultivation, etc., of the several fodder crops grown:—

Name of crop.	Area.	Per acre. Outturn of fodder.	Per acre. Cost of cultivation.	Cost of 100 lbs. of the fodder.	Date of sowing.	Date of flowering.	Remarks.
	A. g.	Lbs.	Rs. a. p.	Rs. a. p.			
Bájri and Chavli (mixed).	6 0	6,413	8 13 5	0 2 2	16th June 1906 ...	29th July 1906 ...	Sown in three plots.
					24th June 1906 ...	2nd August 1906 .	
					31st July 1906 ...	4th October 1906.	
Nilva ...	9 26	5,925	13 9 0	0 3 8	22nd July 1907 ...	24th September 1907.	Sown in two plots.
					Do. ...	Do. ...	
Sundhia ...	7 20	7,942	13 6 0	0 2 8	19th June 1906 ...	5th August 1906 .	Sown in two plots.
					13th July 1906 ...	10th September 1906.	
Hundi ...	7 30	15,668	45 6 2	0 4 7	2nd March 1906...	19th June 1906 ...	Sown in three plots.
					12th April 1906 ...	16th June 1906 ...	
					14th May 1906 ...	22nd July 1906 ...	

Name of crop.	Area.	Per acre. Outturn of fodder.	Per acre. Cost of cultivation.	Cost of 100 lbs. of the fodder.	Date of sowing.	Date of flowering.	Remarks.
	A. g.	Lbs.	Rs. a. p.	Rs. a. p.			
Hundi Ratoon ...	7 30	1,817	8 9 9	0 7 7	2nd March 1906...	12th August 1906.	Sown in three plots.
					12th April 1906 ...	14th October 1906.	
					14th May 1906 ...	20th October 1906.	
Maize ...	12 23	[illegible]	32 12 7	0 9 5	4th May 1906 ...	12th June 1906 ...	Sown in seven plots.
					15th May 1906 ...	17th June 1906 ...	
					6th August 1906 .	24th October 1906.	
					25th September 1906.	1st January 1907 .	
					27th October 1906.	Do. ...	
					10th December 1906.	16th February 1907.	
					15th December 1906.	14th February 1907.	
Sorghum ...	0 38	6,098	20 5 2	0 5 3	9th June 1906 ...	29th July 1906.	
Shálu ...	0 38	2,488	15 12 7	0 10 2	23rd October 1906.	6th February 1907.	
Peas and oats (mixed).	3 17	3,078	33 2 2	1 1 2	16th November 1906.	19th February 1907.	Sown in two plots.
					28th December 1906.	5th March 1907 ...	
Utávali ...	3 29	5,970	11 0 7	0 2 11	3rd July 1906 ...	26th August 1906.	Sown in three plots
					20th August 1906.	6th December 1906.	
					30th August 1906	9th December 1906.	
(Mixed) Jowár...	0 10	2,920	12 8 8	0 6 10	25th January 1907	29th March 1907 .	
Khapli ...	2 10	2,857	15 13 0	0 8 10	25th January 1907.	Do.	
Bájri ...	0 15	3,869	12 8 5	0 5 4	1st August 1906...	27th September 1906.	
Bájri Ratoon ...	2 0	...	...	...	.....	.....	The standing crop was fed to the bullocks, the ratoon crop being too poor.
Dry Fodders.							
Bájri ...	2 0	702	5 4 11	0 12 1	31st July 1906 ...	22nd November 1906.	
Sundhia ...	3 15	4,864	27 0 4	0 8 10	6th June 1906 ...	3rd September 1906.	Sown in two plots
					8th July 1906 ...	16th September 1906.	
Nilva ...	4 33	4,806	8 15 7	0 2 11	29th July 1906 ...	11th November 1906.	

III.—LANOWLI AGRICULTURAL STATION, 1906-07.

Established—1904; *North Latitude*—18° 45′; *East Longitude*—73° 27′; *Elevation*—2,039 feet above sea level; *Soil*—light; *Average rainfall*—186 inches.

Area—30 acres.

Overseer—Mr. A. R. Nikam.

	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Rainfall (1906-07) ...	...	...	21 93	54 9	35 76	19 74	0 53	...	...	...	...	0 64	140 72
Average ...	0 43	0 87	29 3	71 81	56 46	23 66	3 9	0 84	0 25	0 5	0 8	...	183 56

I.—Introduction.

2. This Station consists of 6 survey numbers and is situated at a distance of about two miles to the south from the Railway station. This area is situated in the Bhusi village. The following statement shows the areas, rent and assessment :—

Survey No.	Area.		Rent.	Assessment.		
	A.	g.	Rs.	Rs.	a.	p.
51	4	37	75	9	0	0
91	7	10		1	8	0
74	3	6	15	5	0	0
100	3	11	100	9	0	0
104	7	2		3	0	0
102	4	31	50	12	0	0
Total ...	30	17	240	39	8	0

Out of this area, 11 acres and [illegible] gunthas were under cultivation, the rest of the portion being hilly.

3. *Plotting.*—The six survey numbers were divided into 16 fields for convenience. Field V was divided into 14 half-guntha plots and 8 one-guntha plots. Field VI was divided into 18 half-

guntha plots and 8 one-guntha plots. Field No. VII was divided into 4 one-guntha plots. Field No. IX was divided into 9 quarter-guntha, 12 half-guntha and 5 one-guntha plots. Field No. XII was divided into 3 two and a half guntha plots. The above fields were devoted to raise seedlings of experimental plots. The seedlings of varieties were raised in field No. XIV. The fields I, II, III, IV, VIII, X, XI, XIII, XV and XVI were divided into several plots to receive the seedlings raised on different kinds of ráb and manures. All the varieties were transplanted in field No. XVI.

In the hilly portion of survey No. 104, two varieties of Nágli (Mutki and Zipri), Vari and Sáva were grown. The tree cottons transplanted in 1905 occupy a part of this hilly portion.

II.—Season.

4. During the year under report there were no ante-monsoon showers. The seed was broad-casted in ráb beds as usual by the end of May. The monsoon broke out on the 7th of June. The rainfall during the months of June and July was falling almost daily with breaks at intervals. This was quite favourable for the growth and transplantation of seedlings. The transplantation commenced by the middle of July and was finished by the end of the month. In the second fortnight of July the rainfall was heavy, *viz.* 36¾ inches. In August the rain fell just when wanted. From the latter part of September the rainfall was deficient for the standing crops. This deficiency has reduced the outturn of rice considerably. There was a thunderstorm on the 8th of October followed by strong winds. This caused the vigorous growing crops to lodge. Harvesting of ráb experimental plots was commenced on the 26th of October and was over by the 24th November. During the season 135 inches of rain was recorded against 106½ inches of last year.

III.—Ra'b Experiments.

5. Rice may be sown direct in the field or may be sown first in seed-beds and then the seedlings transplanted to the field. In the preparation of seed beds in this tract it is the custom to cover them with a layer of branches, grass, leaves or cowdung or a mixture of all and slowly burn. The ground is then lightly stirred with a harrow and the seed sown. The burning of this material constitutes the process known in vernacular as "Dádha Bhájane" and the material used as "Ráb".

6. *Objects of the present experiments.*—The practice of rábing as at present carried on is very injurious to forest growth and in the case of cowdung, there is a great loss of manurial substance. The present experiments were instituted to investigate the following questions :—

I.—What does the efficiency of ráb depend upon?

II.—What rábs are most beneficial?

III.—Can any substitute for the present custom be found?

IV.—Will any after-treatment of the crop secure the effects of ráb?

7. *Treatment of seed-beds.*—The experiments were divided into eleven series which were further sub-divided into 63 plots. Series I*a*, I*b*, III, VII and IX had duplicate plots.

Series Ia.—Object.—To ascertain the merits of the practice of rábing.

Plot No. 1.—Ain loppings covered with the usual quantity of grass and earth. All materials were weighed and burnt.

Plot No. 2.—This was treated with ashes obtained in the following way: An equal quantity of Ain loppings, grass and earth was spread on corrugated iron sheets in the same thickness as in Plot No. 1. The material was weighed and burnt. Ashes were collected, weighed and spread out equally on the plot and mixed lightly with earth by rakes (Dantale).

Plot No. 3.—No treatment of any kind.

Plot No. 4.—The soil in this plot was pulverized until the condition of dust.

Plot No. 5.—The earth to the depth of 3 inches was taken off and spread in a layer 3 inches deep on sheets of corrugated iron raised on stones, one foot high. The earth was heated for one hour by burning fuel underneath the sheets. When the earth was cooled down, it was collected and spread again evenly on the plot.

Series Ib.—Plots 6 to 10.—Received the same treatment as Series I (*a*), but the ráb used was mixed branches.

Series II.—Object—To compare different kinds of ráb.

Plot No. 11.—Ain ráb as usual.

„ No. 12.—Cowdung ráb as usual.

„ No. 13.—Mixed branches ráb as usual.

„ No. 14.—Grass ráb.

„ No. 15.—Leaf ráb.

Series III.—Object—To ascertain the usefulness of certain possible substitutes to be applied to the seed bed in lieu of ráb.

Plot No. 16.—Treated with mixed branches ráb, 20,000 lbs. per acre.

„ No. 17.—Safflower cake, 12,800 lbs. per acre.

„ No. 18.—Treated with cowdung ráb, 44,240 lbs. per acre.

„ No. 19.—Poudrette, 44,240 lbs. per acre.

„ No. 20.—Fish manure, 12,960 lbs. per acre.

„ No. 21.—Sheep manure, 2,880 lbs. (6 bags) per acre.

„ No. 22.—Nitre, 8,400 lbs. per acre.

„ No. 23.—Outside ashes, 16,000 lbs. per acre.

Series IV.—Object—To ascertain the most economical method of applying cowdung for raising seedlings.

Plot No. 24.—Cowdung ráb, 44,240 lbs. per acre.

„ No. 25.—Cowdung ashes, 12,280 lbs. per acre.

„ No. 26.—Cowdung ploughed in 22,120 lbs. per acre.

Series V.—Object—To ascertain the comparative value of oilcakes.

Plot No. 27.—Manured with safflower cake, 6,480 lbs. per acre.

„ No. 28.—Undi cake manure, 16,000 lbs. per acre.

„ No. 29.—Karanj cake manure, 11,080 lbs. per acre.

„ No. 30.—Niger cake manure, 13,000 lbs. per acre.

„ No. 31.—Ráyan cake manure, 13,000 lbs. per acre.

Series VI.—Object—To ascertain the most profitable quantity of safflower cake required for raising seedlings.

Plot No. 32.—Treated with safflower cake manure equal to the value of cowdung ráb at normal price, 9,600 lbs. per acre.

„ No. 33.—Treated with cowdung ráb, 44,240 lbs. per acre.

„ No. 34.—Manured with safflower cake, 8,000 lbs. per acre.

„ No. 35.—Manured with safflower cake, 4,000 lbs. per acre.

Series VII.—Object—To ascertain the most beneficial elements of plant-food for raising seedlings.

Plot No. 36.—Manured with safflower cake, 25,920 lbs. per acre.

„ No. 37.—Manured with sulphate of potash, 1,920 lbs. per acre.

„ No. 38.—Manured with superphosphate, 22,880 lbs. per acre.

„ No. 39.—No treatment of any kind.

„ No. 40.—Cowdung ráb ... 44,160 lbs. per acre.

„ No. 41.—	Safflower cake ...	25,920	„	„
	Sulphate of potash	1,920	„	„
	Superphosphate ...	22,880	„	„
„ No. 42.—	Safflower cake ...	25,920	„	„
	Sulphate of potash	1,920	„	„
„ No. 43.—	Safflower cake ...	25,920	„	„
	Superphosphate ...	22,880	„	„
„ No. 44.—	Sulphate of potash	1,920	„	„
	Superphosphate ...	22,880	„	„

Series VIII.—Object—To ascertain lime requirements.

Plot No. 45.—Cowdung ráb ... 44,240 lbs. per acre.

„ No. 46.—Lime ... 2,400 „ „

„ No. 47.—No treatment.

„ No. 48.—Lime ... 6,000 „ „

Series IX (Duplicate).—Object—To compare field manuring with seed-bed manuring.

Plot No. 49.—Mixed branches ráb as usual.

„ No. 50.—Cowdung ráb as usual.

„ No. 51.—No ráb.

The seedlings raised in each of the above plots (49, 50 and 51) were transplanted in 5 two-guntha plots and manured in the fields as under :—

(*a*) Manured with cowdung manure 7,360 lbs. per acre.

(*b*) Safflower cake ... ... 720 „ „

(*c*) Poudrette ... ... 7,360 „ „

(*d*) No treatment.

(*e*) Nitre ... ... 380 „ „

Series X.—Object—To compare field manuring with seed-bed manuring.

Plots Nos. 52 to 59.—The seed-beds were treated with cowdung ráb as usual and the transplanted area received different manures as follows:—

(1) Sulphate of potash ... ... 330 lbs. per acre.
(2) Safflower cake ... ... 360 „ „
(3) Superphosphate ... ... 100 „ „
(4) Manures same as plots 1, 2 and 3, *i. e.* { 330 „ „ / 360 „ „ / 100 „ „ }
(5) No treatment.
(6) Manure same as plots 1 and 2 ... { 330 „ „ / 360 „ „ }
(7) Manure same as plots 2 and 3 ... { 360 „ „ / 100 „ „ }
(8) Manure same as plots 1 and 3 ... { 330 „ „ / 100 „ „ }

Series XI.—Object—To compare field manuring with seed-bed manuring.

Plots Nos. 60 to 63.—The seed-beds were treated with cowdung ráb as usual. The transplanted area received the field applications as below:—

(1) Lime ... ... 1,600 lbs. per acre.
(2) Lime and cowdung ... { 1,600 „ „ / 3,880 „ „ }
(3) Cowdung manure only ... 3,680 „ „
(4) No treatment.

The following statement shows the quantity of ráb materials used for different plots and their cost:—

No. of plot.	Area.	Kind of treatment.	Quantity of ráb materials put on in the seed-bed.	Cost of ráb materials and application charges.
	Gunthas.	**Series I-A in duplicate.**	Lbs.	Rs. a. p.
1	½	Ain ráb ...	240 branches of Ain ... / 112 grass ... .. / 93 earth	1 4 0
6	½	Do. ...	265 branches of Ain .. / 126 grass ... ... / 124 earth	1 4 0

No. of plot.	Area.	Kind of treatment.	Quantity of rab materials put on in the seed-bed.	Cost of rab materials and application charges.
	Gunthas.	**Series I-A in duplicate—** *continued.*	Lbs.	Rs. a. p.
2	½	Ashes of Ain rab	122 ashes of Ain branches ...	1 8 0
7	½	Do.	115 do. ...	1 8 0
3	½	No treatment	.....	.....
8	½	Do.	.....	.....
4	½	Earth pulverized	.....	0 6 0
9	½	Do.	.....	0 6 0
5	½	Earth heated	.....	1 12 0
10	½	Do.	.....	1 12 0
		Series I-B in duplicate		
1	½	Mixed branches rab ...	260 branches ... ... 120 grass ... ... 94 earth	0 14 0
6	½	Do. ...	260 branches ... .. 128 grass ... ... 124 earth	0 14 0
2	½	Ashes of mixed branches ...	142 ashes of mixed branches.	1 0 0
7	½	Do. ...	175 do. ...	1 2 0
3	½	No treatment	.....	.....
8	½	Do.	.....	.....
4	½	Earth pulverized	.....	0 6 0
9	½	Do.	.....	0 6 0
5	½	Earth heated	.....	1 12 0
10	½	Do.	.....	1 12 0
		Series II.		
1	1	Ain rab ...	830 branches ... ... 171 grass ... .. 217 earth	2 4 0
2	1	Cowdung rab ...	1,106 cowdung ... ... 162 grass ... ... 155 earth	3 8 0
3	1	Mixed branches rab ...	538 branches ... ... 159 grass ... ... 185 earth	2 8 0
4	1	Grass rab ...	415 grass ... ... 155 earth	1 0 0
5	1	Leaf rab ...	887 leaves ... ... 160 grass ... ... 193 earth	2 0 0
		Series III in duplica e		
1	½	Mixed branches rab ...	260 branches ... ... 145 grass ... ... 124 earth	1 3 0
9	½	Do. ...	255 branches ... ... 128 grass ... ... 93 earth	1 3 0
2	½	Safflower cake	162 safflower	1 11 4
10	½	Do.	162 do.	1 11 4
3	½	Cowdung rab ...	553 cowdung ... ... 112 grass ... ... 80 earth	2 1 0

No. of plot.	Area.	Kind of treatment.	Quantity of ráb materials put on in the seed-bed.	Cost of ráb materials and application charges.
	Gunthas.	**Series III in duplicate—** *continued.*	Lbs.	Rs. a. p.
11	½	Cowdung ráb ...	553 cowdung ... ... 114 grass ... .. 80 earth	2 1 0
4	½	Poudrette	553 poudrette	1 7 0
12	½	Do.	553 do.	1 7 0
5	½	Fish	162 fish	6 2 4
13	½	Do.	162 do.	6 12 4
6	½	Dung from folded sheep ...	260 sheep-dung	1 5 0
14	½	Do. ..	260 do.	1 5 0
7	½	Nitre	80 nitre	8 10 0
15	½	Do.	80 do.	8 10 0
8	½	Outside ashes	200 outside ashes	0 5 0
16	½	Do.	200 do.	0 5 0
		Series IV.		
1	1	Cowdung ráb ...	1,106 cowdung ... .. 198 grass ... ... 355 earth	3 7 0
2	1	Ashes of cowdung	307 ashes	3 8 0
3	1	Cowdung ploughed in	553 cowdung	2 2 0
		Series V.		
1	1	Safflower cake	162 safflower cake	1 11 4
2	1	Undi cake	400 Undi cake	14 2 0
3	1	Karanj cake	227 Karanj cake	7 0 9
4	1	Niger cake	325 niger cake	3 6 0
5	1	Ráyan cake	325 Ráyan cake	5 4 0
		Series VI.		
1	½	Safflower cake	120 safflower cake	1 4 9
2	½	Cowdung ráb ...	553 cowdung ... ... 100 grass ... ... 75 earth	1 12 0
3	½	Safflower cake	100 safflower cake	1 1 8
4	½	Do.	50 do.	0 8 10
		Series VII in duplicate.		
1	¼	Safflower cake	162 safflower cake	1 10 4
10	¼	Do.	162 do.	1 10 4
2	¼	Sulphate of potash	12 sulphate of potash ...	1 3 0
11	¼	Do.	12 do. ...	1 3 0
3	¼	Superphosphates	143 superphosphates ...	11 14 11
12	¼	Do.	143 do. ...	11 14 11
4	¼	No treatment	.....	.....
13	¼	Do.	.....	.....
5	¼	Cowdung ráb ...	276 cowdung ... ... 60 grass ... ... 36 earth	1 0 0
14	¼	Do. ...	276 cowdung ... ... 60 grass ... ... 36 earth	1 0 0
6	¼	Safflower cake ... .. + sulphate of potash ... ... + superphosphates	162 safflower ... ... 12 sulphate of potash ... 143 superphosphates ...	14 10 3
15	¼	Do.	Do. ...	14 10 3

No. of plot.	Area.	Kind of treatment.	Quantity of ráb materials put on in the seed-bed.	Cost of ráb materials and application charges.
	Gunthas.	**Series VII in duplicate** —*continued.*	Lbs.	Rs. a. p.
7	¼	Safflower cake ... .. + sulphate of potash	162 safflower cake ... ... 12 sulphate of potash ...	2 12 4
16	¼	Do.	Do. ...	2 12 4
8	¼	Safflower cake ... .. + superphosphates	162 safflower cake .. 143 superphosphates ..	13 8 3
17	¼	Do.	Do ...	13 8 3
9	¼	Sulphate of potash ... .. + superphosphates	12 sulphate of potash ... 143 superphosphates ..	13 0 11
18	¼	Do.	Do. ...	13 0 11
		Series VIII.		
1	½	Cowdung ráb ...	553 cowdung ... ... 100 grass ... ... 72 earth	1 12 0
2	½	Lime	30 lime	0 7 6
3	½	No treatment	.....	... ..
4	½	Lime	75 lime	0 12 10
		Series IX in duplicate.		
1	2½	Mixed branches ráb ...	3 cart l branches ... 445 grass ... ... 310 earth	7 6 0
4	2½	Do. ...	3 cart loads branches ... 4·7 grass ... ... 350 earth	7 6 0
2	2½	Cowdung ráb ...	2,765 cowdung ... ... 300 grass ... ... 170 earth	9 12 0
5	2½	Do. ...	2,765 cowdung ... ... 300 grass ... ... 170 earth	9 12 0
3	2½	No ráb	.....	.....
6	2½	Do.	.....	.....
		Series X.		
1	1	Cowdung ráb ...	1,106 cowdung ... ... 144 grass ... ... 93 earth	2 9 0
2	1	Do.	Same as above	2 9 0
3	1	Do.	Do.	2 9 0
4	1	Do.	Do.	2 9 0
5	1	Do.	Do.	2 9 0
6	1	Do.	Do.	2 9 0
7	1	Do.	Do.	2 9 0
8	1	Do.	Do.	2 9 0
		Series XI.		
1	1	Cowdung ráb ...	1,106 cowdung ... ... 144 grass ... ... 93 earth	2 9 0
2	1	Do.	Do.	2 9 0
3	1	Do.	Do.	2 9 0
4	1	Do.	Do.	2 9 0

8. *Results with regard to seedlings.*—During the year under report the seedlings from Series IA, IB and IX were very much damaged by crabs. The following statement shows the area actually transplanted and the cost of raising seedlings sufficient for transplanting an acre :—

No. of plot.	Kind of treatment.	Area actually transplanted.	Corrected for crab eaten portions and blanks.	Cost of raising seedlings sufficient for transplanting one acre.		
	Series I-A.					
		Gunthas.	Gunthas.	Rs.	a.	p.
1	Ain ráb	1½	2	28	2	0
2	Ashes of Ain ráb	1½	2	33	2	0
3	No treatment	1¼	1½	4	1	0
4	Earth pulverized	1½	2	10	6	8
5	Earth heated	1½	2	37	14	8
	Series I-B in duplicate.					
1	Mixed branches ráb ...	1½	2	20	6	8
6	Do. ...	2	2	20	6	8
2	Ashes of mixed branches ...	1½	2	25	6	8
7	Do. ...	2	2	22	14	8
3	No treatment	1¼	1½	3	12	8
8	Do.	1½	1½	3	12	8
4	Earth pulverized	1½	2	10	6	8
9	Do.	1½	2	10	6	8
5	Earth heated	1½	2	37	14	8
10	Do.	1¾	2	37	14	8
	Series II.					
1	Ain ráb	5	5	20	6	0
2	Cowdung ráb	8	8	18	15	9
3	Mixed branches ráb ..	5	5	22	6	0
4	Grass ráb	5	5	10	6	0
5	Leaf ráb	5	5	13	6	0
	Series III in duplicate.					
1	Mixed branches ráb ...	2½	2½	21	5	4
9	Do. ...	2½	2½	21	5	4
2	Safflower cake	2¾	2¾	25	15	4
10	Do.	2½	2¾	25	15	4
3	Cowdung ráb	2½	2¾	30	14	8
11	Do.	2½	2½	30	14	8
4	Poudrette	2¾	3	25	5	4

No. of plot.	Kind of treatment.	Area actually transplanted.	Corrected for crab eaten portions and blanks.	Cost of raising seedlings sufficient for transplanting one acre.		
	Series III in duplicate.—*contd.*	Gunthas.	Gunthas.	Rs.	a.	p.
12	Poudrette	2½	2½	20	9	4
5	Fish manure	3	3	92	3	6
13	Do.	2½	2½	110	10	8
6	Sheepdung	2½	2½	23	5	4
14	Do.	2½	2½	23	5	4
7	Nitre	2½	2½	175	6	8
15	Do.	1½	2	140	5	4
8	Outside ashes	2½	2½	9	2	8
16	Do.	1½	2	7	5	4
	Series IV.					
1	Cowdung ráb	5½	6	24	4	9
2	Ashes of cowdung ...	5	5	30	6	0
3	Cowdung ploughed in ...	6	6	15	2	2
	Series V.					
1	Safflower cake	6	6	12	8	6
2	Undi cake	6	6	90	2	2
3	Karanj cake	6	6	45	14	4
4	Niger cake	7	7	22	0	6
5	Ráyan cake	6½	6½	33	4	6
	Series VI.					
1	Safflower cake	2½	2½	23	1	4
2	Cowdung ráb	2½	2½	30	5	4
3	Safflower cake	2	2	25	0	0
4	Do.	2	2	13	15	4
	Series VII in duplicate.					
1	Safflower cake	1¼	1½	42	15	6
10	Do.	1½	1½	42	15	6
2	Sulphate of potash ...	1¼	1½	31	8	2
11	Do.	1½	1½	31	8	2
3	Superphosphates	1¼	1½	300	2	1
12	Do.	1½	1½	300	2	1
4	No treatment	1	1	2	14	8
13	Do.	1½	1½	1	13	2
5	Cowdung ráb	1¼	1¼	34	5	4
14	Do.	1½	1½	26	13	2

No. of plot.	Kind of treatment.	Area actually transplanted.	Corrected for crab eaten portions and blanks.	Cost of raising seedlings sufficient for transplanting one acre.		
	Series VII in duplicate.—*contd.*	Gunthas.	Gunthas.	Rs.	a.	p.
6	Safflower cake + Sulphate of potash + Superphosphates ...	1¼	1¼	470	13	4
15	Do. do. ...	1½	1½	367	13	5
7	Safflower cake + Sulphate of potash	1¼	1¼	91	0	0
16	Do. do. ..	1	1	113	12	0
8	Safflower cake + Superphosphates	1¼	1¼	434	13	4
17	Do. do. ..	1	1	543	8	8
9	Sulphate of potash + Superphosphates	1¾	1¾	288	13	10
18	Do. do. ...	2	2	262	9	8
	Series VIII.					
1	Cowdung ráb	2½	2½	30	5	4
2	Lime	2¼	2¼	11	1	0
3	No treatment	2¼	2¼	2	10	0
4	Lime	1½	1½	24	10	4
	Series IX in duplicate.					
1	Mixed branches ráb ...	10	10	32	7	4
4	Do.	5	10	32	7	4
2	Cowdung ráb	12½	12½	33	9	0
5	Do.	8	12½	33	9	0
3	No ráb	9	9	3	4	0
6	Do.	2	9	3	4	0
	Series X.					
1	Cowdung ráb	6½	6½	17	2	6
2	Do.	6½	6½	17	2	6
3	Do.	6½	6½	17	2	6
4	Do.	5	5	22	14	0
5	Do.	5	5	22	14	0
6	Do.	5	5	22	14	0
7	Do.	5	5	22	14	0
8	Do.	5	5	22	14	0
	Series XI.					
1	Cowdung ráb	5	5	22	14	0
2	Do.	5	5	22	14	0
3	Do.	5	5	22	14	0
4	Do.	5	5	22	14	0

The area of the seed beds was not the same in all cases. The cowdung ráb plot of one guntha supplied seedlings sufficient for transplanting 8 gunthas, and almost all oilcake plots, poudrette and fish manure plots supplied seedlings for 6 gunthas each.

The cost of raising seedlings varies greatly and is very high. The Ain and mixed branches had to be brought from long distances and the artificial manures were very costly. The Undi cake was brought from Ratnágiri and Ráyan from Nadiád.

9. *Results of field crops.*—The seedlings from cake, fish, poudrette and cowdung plots were healthy and vigorous in the seed beds as well as in the transplanted area. The seedlings raised on artificial manures were healthy and strong in the seed beds, but they fared poorly in the transplanted area.

So far as the figures given below prove anything, they indicate that cowdung ráb has justified its reputation among cultivators as the best preparation for the seed bed. The yields are however much too uneven to be reliable.

Field No.	Plot No.	Kind of treatment.	Cost per acre.				Outturn per acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost of after treatment.	Cost of cultivation in the transplanted area.	Total cost of cultivation.	Grain.	Straw.	Total Value of outturn.		
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
		Series I-A.									
4	1	Ain ráb	28 2 0	...	19 13 9	47 15 9	1,600	1,920	60 0 0	+12 0 3	
...	2	Ashes of Ain ráb	33 2 0	...	19 13 9	52 15 9	1,440	1,920	55 0 0	+2 0 3	
...	3	No treatment	4 1 0	...	...	4 1 0	...	...	...	—4 1 0	All seedlings washed away by rain after transplantation.
...	4	Earth pulverized	10 6 8	...	...	10 6 8	...	...	...	—10 6 8	
...	5	Earth heated	37 14 8	...	19 13 9	57 12 5	800	1,600	33 5 3	—24 7 2	
		N. B.—Seedlings raised in the duplicate plots were just enough for transplanting the seed-beds.									
		Series I-B.									
4	6	Mixed branches ráb	20 6 8	...	19 13 9	40 4 5	1,120	1,440	42 8 0	+2 3 7	
8	1	Do.	20 6 8	...	14 14 4	35 5 0	1,056	1,216	39 8 3	+4 0 3	
4	7	Ashes of mixed branches ...	22 14 8	...	19 13 9	42 12 5	896	1,280	34 10 6	—8 1 11	
8	2	Do. ...	25 6 8	...	14 14 4	40 5 0	720	800	26 10 6	+13 10 6	
4	8	No treatment	3 12 8	...	14 14 4	18 11 0	480	1,280	21 10 6	+2 15 6	
8	3	Do.	3 12 8	...	...	3 12 8	...	...	...	—3 12 8	Seedlings washed away by rain.
4	9	Earth pulverized	10 6 8	...	19 13 9	30 4 5	400	800	16 10 6	—13 9 11	
8	4	Do.	10 6 8	...	19 13 9	30 4 5	480	800	19 2 6	—11 1 11	
4	10	Earth heated	37 14 8	...	19 13 9	57 12 5	640	1,280	26 10 6	—31 1 11	
8	5	Do.	37 14 8	...	17 0 4	54 15 0	640	1,600	28 5 3	—25 9 9	

		Series II.										
4	11	Ain ráb	20 6 0	...	16 9 0	36 15 0	1,280	1,547	48 0 9	+11 1 9
...	12	Cowdung ráb	18 15 9	...	16 9 0	35 8 9	2,110	2,300	77 14 6	+42 5 9
...	13	Mixed branches ráb	22 6 0	...	16 9 0	38 15 0	1,220	1,440	45 10 0	+6 11 0
...	14	Grass ráb	10 6 0	...	16 9 0	26 15 0	846	1,257	32 15 9	+6 0 9
...	15	Leaf ráb	18 6 0	...	16 9 0	34 15 0	613	853	23 9 6	—11 5 6
		Series III.								
8	6	Mixed branches ráb	21 5 4	...	15 8 0	36 13 4	1,143	1,371	42 13 9	+6 0 5
15	1	Do.	21 5 4	...	19 10 8	41 0 0	1,160	1,640	44 12 6	+3 12 6
8	7	Safflower cake	25 15 4	...	14 1 0	40 0 4	1,440	1,720	53 15 8	+13 14 11
15	2	Do.	25 15 4	...	19 10 8	45 10 0	1,480	2,000	56 10 6	+11 0 6
8	8	Cowdung ráb	30 14 8	...	15 8 0	46 6 8	1,420	1,560	52 8 0	+6 1 4
15	3	Do.	30 14 8	...	19 10 8	50 9 4	1,600	2,240	61 10 6	+11 1 2
8	9	Poudrette	20 9 4	...	14 1 0	34 10 4	1,360	1,480	50 3 3	+15 8 11
15	4	Do.	25 5 4	...	19 10 8	45 0 0	1,560	2,320	60 13 3	+15 13 3
8	10	Fish manure	110 10 8	...	19 6 0	130 0 8	1,520	1,800	56 14 0	—73 2 8
15	5	Do.	92 3 6	...	24 9 4	116 12 10	1,720	2,460	66 9 0	—50 3 10
8	11	Sheep dung	23 5 4	...	15 8 0	38 13 4	1,360	1,760	51 10 6	+12 13 2
15	6	Do.	23 5 4	...	19 10 8	43 0 0	1,240	1,800	48 2 0	+5 2 0
8	12	Nitre	140 5 4	...	15 8 0	155 13 4	1,308	1,633	49 2 9	—106 10 7
15	7	Do.	175 3 8	...	23 15 5	208 6 1	800	1,280	31 10 6	—176 11 7
8	13	Outside ashes	7 5 4	...	15 8 0	23 13 4	777	1,207	29 15 9	+7 2 5
15	8	Do.	9 2 8	...	32 15 5	42 2 1	800	1,184	31 2 6	—10 15 7
		Series IV.								
2	1	Cowdung ráb	24 4 4	...	21 4 0	45 8 4	1,550	1,760	57 9 6	+12 1 2
...	2	Ashes of cowdung	30 6 0	...	21 4 0	51 10 0	1,100	1,320	41 4 9	—10 5 3
...	3	Cowdung ploughed in	15 2 2	...	21 4 0	36 6 2	1,420	1,680	53 2 0	+16 11 10

Field No.	Plot No.	Kind of treatment.	Cost per acre.				Outturn per acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost of after treatment.	Cost of cultivation in the transplanted area.	Total cost of cultivation.	Grain.	Straw.	Total value of outturn.		
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
		Series V.									
10	1	Safflower cake	12 8 6	...	16 12 8	30 5 2	978	1,320	37 4 3	+7 15 1	These plots were situated on a poor soil.
...	2	Undi cake	90 2 2	...	16 12 8	106 14 10	1,268	1,820	44 6 6	—62 8 4	
...	3	Karanj cake	45 14 4	...	16 12 8	62 11 0	1,456	1,856	55 2 6	—7 8 6	
...	4	Niger cake	23 0 6	...	16 12 8	39 13 2	1,472	1,792	55 5 3	+15 8 1	
...	5	Ryan cake	33 4 6	...	16 12 8	50 1 2	942	1,182	35 9 6	—14 7 8	
		Series VI.									
8	14	Safflower cake	23 1 4	...	19 6 0	42 7 4	1,060	1,160	39 2 6	—3 4 10	Yield low on account of poor soil.
...	15	Cowdung rib	30 5 4	...	19 6 0	49 11 4	680	880	25 11 6	—23 15 10	
...	16	Safflower cake	25 0 0	...	19 6 0	44 6 0	853	1,040	32 1 0	—12 5 0	
...	17	Do.	13 15 4	...	...	...	...	...	...	.....	Seedlings were washed by rain.
		Series VII.									
11	1	Safflower cake	42 15 6	...	27 8 0	70 7 6	1,760	2,060	65 11 6	—4 12 0	
15	17	Do.	42 15 6	...	22 12 5	65 11 11	720	1,200	28 12 0	—36 15 11	
11	2	Sulphate of Potash	31 8 2	...	27 8 0	58 0 2	1,520	1,720	56 7 3	—2 3 11	
15	18	Do.	31 8 2	...	22 12 5	54 4 7	507	1,333	22 12 6	—31 8 1	
11	3	Superphosphates	300 2 1	...	27 8 0	327 10 1	1,707	2,240	65 0 0	—262 10 1	
15	19	Do.	300 2 1	...	22 12 5	322 14 6	880	1,466	35 2 0	—287 12 6	

11	4	No treatment	2 14 8	...	27 8 0	30 6 8	809	1,173	31 1 9	+0 11 1	
15	20	Do.	1 13 2	...	22 12 5	24 9 7	533	1,120	22 7 9	−2 1 10	
11	5	Cowdung ráb	34 5 4	...	27 8 0	61 13 4	1,173	1,493	44 6 3	−17 7 1	
15	21	Do.	26 13 2	...	22 12 5	49 9 7	880	1,520	35 6 6	−14 3 1	
11	6	Safflower cake + Sulphate of Potash + Superphosphates.	470 13 4	...	27 8 0	498 5 4	1,173	1,706	45 8 6	−452 12 10	
15	22	Do. do. ...	267 13 5	...	22 12 5	290 9 10	1,093	1,660	42 7 9	−248 2 1	
11	7	Safflower cake + Sulphate of Potash .	91 0 0	...	27 8 0	118 8 0	1,320	1,760	50 6 6	−68 1 6	
15	23	Do. do. ...	113 12 0	...	22 12 5	136 8 5	1,040	1,480	40 3 8	−96 5 2	
11	8	Safflower cake + Superphosphates ...	434 13 4	...	27 8 0	462 5 4	1,360	1,800	50 13 8	−411 6 1	
15	24	Do. do. ...	543 8 8	...	22 12 5	566 5 1	1,000	1,600	39 9 8	−526 11 10	
11	9	Sulphate of Potash + Superphosphates.	288 13 10	...	27 8 0	316 5 10	858	969	31 10 6	−284 11 4	
15	25	Do. do. ...	262 9 8	...	22 12 5	285 6 1	900	1,280	34 12 6	−250 9 7	The results from field No. 15 are low on account of poor soil.
		Series VIII.									
1	1	Cowdung ráb	30 5 4	...	20 10 0	50 15 4	1,040	1,360	39 9 3	−11 6 1	
...	2	Lime	11 1 0	...	20 10 0	31 11 0	969	1,097	33 18 9	+1 2 9	
...	3	No treatment	2 10 0	...	20 10 0	23 4 0	480	720	18 13 0	−4 8 0	
...	4	Lime	24 10 4	...	20 10 0	45 4 0	800	1,200	31 4 0	−14 0 0	
		Series IX.									
		FIELD APPLICATIONS.									
		(a) Mixed branches ráb in the seed-bed.									
10	1	Cowdung manure	33 7 4	6 4 0	12 11 4	51 6 8	1,000	1,240	37 11 3	−13 11 5	
15	9	Do.	33 7 4	6 4 0	24 6 0	63 1 4	680	1,060	28 12 6	−36 4 10	
10	2	Safflower cake	33 7 4	9 6 0	12 11 4	54 8 8	987	1,600	39 2 9	−15 5 11	
15	10	Do.	33 7 4	9 6 0	24 6 0	66 3 4	780	1,400	31 10 6	−34 9 10	

Field No.	Plot No.	Kind of treatment.	Cost per acre.				Outturn per acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost after treatment.	Cost of cultivation in the transplanted area.	Total cost of cultivation.	Grain.	Straw.	Total value of outturn.		
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
		Series IX—*continued.*									
		FIELD APPLICATIONS —*continued.*									
		(a) *Mixed branches rdb in the seed-bed*—continued.									
10	3	Poudrette	32 7 4	9 1 0	12 11 4	54 8 8	880	1,160	33 8 6	—20 11 2	
15	11	Do.	32 7 4	9 1 0	24 6 0	65 14 4	600	800	22 14 6	—42 15 10	
10	4	No treatment	32 7 4	...	12 11 4	45 2 8	760	1,120	29 9 3	—15 9 5	
15	12					Seedlings were not available.					
10	5	Nitre	32 7 4	41 14 0	12 11 4	87 0 8	880	1,140	33 7 0	—53 9 8	
15	13					Seedlings were not available.					
		(b) *Cowdung rdb in the seed-bed.*									
10	6	Cowdung manure	33 9 0	6 4 0	13 12 0	53 9 0	1,040	1,260	39 1 0	—14 8 0	
15	12	Do.	33 9 0	6 4 0	24 6 0	64 3 0	960	1,300	36 12 3	—27 6 9	
10	7	Safflower cake	33 9 0	9 6 0	13 12 0	56 11 0	1,240	1,520	46 10 6	—10 0 6	
15	13	Do.	33 9 0	9 6 0	24 6 0	67 5 0	1,160	1,780	45 8 3	—21 12 9	
10	8	Poudrette	33 9 0	9 1 0	13 12 0	56 6 0	853	1,024	31 15 9	—24 6 3	
15	14	Do.	33 9 0	9 1 0	24 6 0	67 0 0	960	1,500	37 13 0	—29 3 0	
10	9	No treatment	33 9 0	...	13 12 0	47 5 0	740	840	27 8 0	—19 13 0	
15	15	Do.	33 9 0	...	24 6 0	57 15 0	820	1,560	33 12 0	—24 3 0	
10	10	Nitre	33 9 0	41 14 0	13 12 0	89 3 0	896	1,067	33 8 9	—55 10 3	
15	16					Seedlings were not available.					

		(e) No rdb in the seed-bed.										
10	11	Cowdung manure	3 4 0	6 4 0	13 12 0	23 4 0	720	840	26 14 0	+3 10 0		
15	16	Do.	3 4 0	6 4 0	24 6 0	33 14 0	700	1,060	27 6 3	—6 7 9		
10	12	Safflower cake	3 4 0	9 6 0	13 12 0	26 6 0	896	1,216	34 5 3	+7 15 3		
15	17					Seedlings were not available.						
10	13	Poudrette	3 4 0	9 1 0	13 12 0	26 1 0	427	640	16 10 6	—9 6 6	Crop very poor on account of rocky soil.	
15	18					Seedlings were not available.						
10	14	No treatment	3 4 0	...	13 12 0	17 0 0	720	880	27 1 8	+10 1 3		
15	19					Seedlings were not available.						
10	15	Nitre	3 4 0	42 11 4	22 8 0	68 7 4	747	960	28 5 6	—40 1 10		
15	20					Seedlings were not available.						

N. B.—The seedlings in the ra'b beds were very weak and they were also much affected by crabs.

Series X.

Cowdung rdb in the seed bed.

13	1	Sulphate of potash	17 2 6	32 3 0	18 7 0	67 12 6	1,755	2,188	66 3 9	—1 8 9	
,,	2	Safflower cake	17 2 6	4 11 0	18 7 0	40 4 6	1,920	2,610	73 9 6	+33 5 0	
,,	3	Superphosphates	17 2 6	17 12 2	18 7 0	53 5 8	1,331	1,610	49 14 6	—3 7 2	
,,	4	Sulphate of potash + safflower cake + superphosphates.	22 14 0	52 2 2	18 7 0	93 7 2	1,400	2,600	57 4 6	—36 2 8	
,,	5	No treatment	22 14 0	...	18 7 0	41 5 0	880	1,440	35 0 0	—6 5 0	
,,	6	Sulphate of potash + superphosphates.	22 14 0	35 10 0	18 7 0	76 15 0	1,740	2,380	66 14 9	—10 0 3	
,,	7	Safflower cake + superphosphates...	22 14 0	21 3 2	18 7 0	62 8 2	1,460	2,350	57 13 9	—4 10 5	
,,	8	Sulphate of potash + superphosphates.	22 14 0	48 11 2	18 7 0	90 0 2	1,307	1,632	46 3 6	—43 12 8	

Field No.	Plot No.	Kind of treatment.	Cost per acre.				Outturn per acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost of after treatment.	Cost of cultivation in the transplanted area.	Total cost of cultivation.	Grain.	Straw.	Total Value of outturn.		
			Rs. a. p	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
		Series XI.									
		Cowdung rab in the seed-bed.									
3	1	Lime	22 14 0	14 6 0	20 0 0	57 4 0	1,600	1,760	59 2 6	—1 14 6	
,,	2	Cowdung manure + lime ...	22 14 0	16 4 0	20 0 0	59 2 0	1,360	1,460	46 15 6	—12 2 6	
,,	3	Cowdung manure	22 14 0	4 6 0	20 0 0	47 4 0	1,120	1,220	41 5 6	—5 14 6	
,,	4	No treatment	22 14 0	...	20 0 0	42 14 0	939	1,045	34 12 6	—8 1 6	
,,	5	Complete manure plot	22 14 0	11 7 4	26 14 0	61 3 4	1,920	2,900	75 1 6	+13 14 2	

10. *Results from seed-beds.*—On the whole the outturn results of seed-beds are superior in yield to the transplanted area, and especially so in the Series III, VI and VII.

Field No.	Plot No.	Kind of treatment.	Cost per Acre.			Outturn per Acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost of cultivation in the transplanted Area.	Total cost of cultivation.	Grain.	Straw.	Total value of outturn.		
		Series 1A.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
6	1	Ain ráb ...	23 2 0	20 0 0	43 2 0	1,600	1,760	50 2 6	+11 0 6	
,,	2	Ashes of Ain ...	33 2 0	20 0 0	53 2 0	960	1,440	37 8 0	—15 10 0	
,,	3	No treatment ...	4 1 0	...	4 1 0	...	...	...	—4 1 0	Seedlings washed away by rain.
,,	4	Earth pulverized ...	10 6 8	20 0 0	30 6 8	960	1,280	36 10 6	+6 8 10	
,,	5	Earth heated ...	37 14 8	20 0 0	57 14 8	960	1,280	40 0 0	+17 10 8	
		N. B.—Seedlings from the duplicate seed-beds were enough only for transplantation area.								
		Series IB. ...	Seedlings sufficient for transplantation area only.							
		Series II.								
5	1	Ain ráb ...	30 6 0	26 10 8	47 0 8	1,600	1,520	57 14 6	+10 13 10	
,,	2	Cowdung ráb ...	18 15 9	26 10 8	45 10 5	1,880	2,160	70 0 0	+24 5 7	
,,	3	Mixed branches ráb.	22 6 0	26 10 8	49 0 8	1,440	1,440	52 8 0	+3 7 4	
,,	4	Grass ráb ...	10 6 0	26 10 8	37 0 8	1,320	1,600	49 9 3	+12 8 7	
,,	5	Leaf ráb ...	18 6 0	26 10 8	45 0 0	1,360	1,680	51 4 0	+6 3 4	
		Series III.								
6	6	Mixed branches ráb.	21 5 4	22 8 0	43 13 4	1,760	1,920	65 0 0	+21 2 8	
9	1	Do. ...	21 5 4	27 1 4	48 6 8	2,240	2,040	85 13 3	+36 6 7	
6	7	Safflower cake ...	25 15 4	22 8 0	48 7 4	2,720	2,880	100 0 0	+51 8 8	
9	2	Do. ...	25 15 4	27 1 4	53 0 8	2,240	4,320	92 8 0	+39 7 4	
6	8	Cowdung ráb ...	30 14 8	22 8 0	53 6 8	2,560	2,880	95 0 0	+41 9 4	
9	3	Do. ...	30 14 8	27 1 4	58 0 0	2,240	3,360	87 8 0	+29 8 0	
6	9	Poudrette ...	20 9 4	22 8 0	43 1 4	2,560	2,880	95 0 0	+51 14 8	
9	4	Do. ...	25 5 4	27 1 4	52 6 8	2,320	3,840	92 8 0	+40 1 4	
6	10	Fish manure ...	10 10 8	22 8 0	133 2 8	2,778	5,120	112 1 0	—21 1 8	
9	5	Do. ...	92 3 6	27 1 4	119 4 10	2,400	4,160	96 10 6	—22 10 4	
6	11	Sheep dung ...	23 5 4	22 8 0	45 13 4	2,847	3,093	89 7 3	+43 9 11	
9	6	Do. ...	23 6 4	27 1 4	50 6 8	2,160	3,680	86 10 6	+36 3 10	
6	12	Nitre ...	Seedlings sufficient for transplantation area only.							
9	7	Do. ...	140 5 4	27 1 4	167 6 8	1,760	3,200	71 10 6	—95 12 2	
6	13	Ashes ...	Seedlings sufficient for transplantation area only.							
9	8	Do. ...	9 2 8	27 1 4	36 4 0	1,920	3,680	79 2 6	+42 14 6	

Field No.	Plot No.	Kind of treatment.	Cost per Acre.			Outturn per Acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost of cultivation in the transplanted Area.	Total cost of cultivation.	Grain	Straw.	Total value of outturn.		
		Series IV.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
5	6	Cowdung ráb ...	24 4 4	26 10 8	50 15 0	1,920	3,160	71 4 0	+20 5 0	
,,	7	Ashes of cowdung ..	30 6 0	26 10 8	57 0 8	1,440	1,840	54 9 3	—2 7 5	
,,	8	Cowdung ploughed in	15 2 2	26 10 8	41 12 10	1,920	2,440	72 11 3	+30 14 5	
		Series V.								
9	21	Safflower cake ...	12 8 6	25 0 0	37 8 6	1,920	4,080	81 4 0	+43 11 6	
,,	22	Undi cake ...	90 2 2	25 0 0	115 2 2	1,840	3,600	76 8 0	—38 10 2	
,,	23	Karanj cake ...	45 14 4	25 0 0	70 14 4	1,840	3,520	75 13 3	+4 14 11	
,,	24	Niger cake ..	22 0 6	25 0 0	47 0 6	1,280	2,720	54 2 6	+7 2 0	
,,	25	Ráyan cake ...	33 4 6	25 0 0	58 4 6	1,280	2,640	53 12 0	—4 8 6	
		Series VI.								
5	9	Safflower cake ...	23 1 4	26 10 8	49 12 0	2,240	2,880	85 0 0	+35 4 0	
,,	10	Cowdung ráb ...	30 5 4	26 10 8	57 0 0	1,760	2,240	67 11 3	+10 11 3	
,,	11	Safflower cake ...	25 0 0	26 10 8	51 10 8	2,240	2,880	85 0 0	+33 5 4	
,,	12	Do. ..	13 15 4	26 10 8	40 10 0	2,160	2,560	80 13 3	+39 3 3	
		Series VII.								
9	9	Safflower cake ...	42 15 6	35 0 0	77 15 6	1,920	3,840	80 0 0	+2 0 6	
,,	10	Sulphate of Potash.	31 8 2	35 0 0	66 8 2	1,920	3,340	80 0 0	+13 7 10	
,,	11	Superphosphates ...	300 2 1	35 0 0	335 2 1	2,240	3,840	90 0 0	—245 2 1	
,,	12	No treatment ...	2 14 8	35 0 0	37 14 8	2,240	2,560	83 5 3	+45 6 7	Received manure from adjacent plots.
,,	13	Cowdung ráb ...	34 5 4	35 0 0	69 5 4	2,560	4,480	103 5 3	+33 15 11	
,,	14	Safflower cake + sulphate of potash + superphosphates.	470 13 4	35 0 0	505 13 4	1,280	5,120	66 10 6	—439 2 10	
,,	15	Safflower cake + sulphate of potash	91 0 0	35 0 0	126 0 0	1,280	6,400	73 5 0	—52 11 0	
,,	16	Safflower cake + superphosphates.	434 13 4	35 0 0	469 13 4	1,280	5,120	66 10 6	—403 2 10	
,,	17	Sulphate of potash + superphosphates.	288 13 10	35 0 0	323 13 10	1,280	3,840	62 0 0	—261 13 10	
		N.B.—Seedlings from the duplicate seed-beds were just enough for the transplantation area.								
		Series VIII.								
9	18	Cowdung ráb ...	30 5 4	25 6 8	55 12 0	1,120	2,080	45 13 3	—9 14 9	Soil rocky. Crop thin and eaten by crabs.
,,	19	Lime ...	11 1 0	25 6 8	36 7 8	1,280	1,920	50 0 0	+13 8 4	
,,	20	No treatment ...	2 10 0	25 6 8	28 0 8	960	960	35 0 0	+6 15 4	
,,	21	Lime ...	Seedlings sufficient for transplantation area only.							

Field No.	Plot No.	Kind of treatment.	Cost per Acre.			Outturn per Acre.			Profit (+) or loss (—).	Remarks.
			Cost of raising seedlings.	Cost of cultivation in the transplanted Area.	Total cost of cultivation.	Grain.	Straw.	Total value of outturn.		
		Series IX.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
12	1	Mixed branches ráb.	Seedlings sufficient for transplantation area only.							
,,	2	Cowdung ráb ...	32 7 4	22 0 0	54 7 4	1,088	1,520	41 14 0	—12 8 10	
,,	3	No ráb ...	Seedlings sufficient for transplantation area only.							
		N. B.—Seedlings from the duplicate seed-beds were not enough for transplantation.								
		Series X.								
6	14	Cowdung ráb ...	17 2 6	24 9 4	41 11 10	1,640	1,860	60 10 0	+18 14 2	
	15	Do. ...	17 2 6	24 9 4	41 11 10	1,600	1,720	58 15 3	+17 3 5	
,,	16	Do. ..	17 2 6	24 9 4	41 11 10	1,640	1,720	60 3 3	+18 7 5	
,,	17	Do. ...	22 14 0	24 9 4	47 7 4	1,320	1,410	48 12 0	+1 4 8	
,,	18	Do. ...	22 14 0	24 9 4	47 7 4	1,360	1,600	50 13 3	+3 5 11	
,,	19	Do. ...	22 14 0	24 9 4	47 7 4	1,480	1,560	54 6 0	+6 14 8	
,,	20	Do. ...	22 14 0	24 9 4	47 7 4	1,160	1,360	43 5 3	—4 2 1	
,,	21	Do. ...	22 14 0	24 9 4	47 7 4	1,320	1,560	49 6 0	+1 14 8	
		Series XI.								
7	1	Cowdung ráb ...	22 14 0	24 6 0	47 4 0	1,560	1,800	58 2 0	+10 14 0	
,,	2	Do. ..	22 14 0	24 6 0	47 4 0	1,560	1,680	57 8 0	+11 4 0	
,,	3	Do. ..	22 14 0	24 6 0	47 4 0	1,560	1,720	57 11 3	+10 7 3	
,,	4	Do. ...	22 14 0	24 6 0	47 4 0	1,480	1,640	54 12 6	+7 8 6	

Variety tests.

11. Fifty-four varieties of rice from the Bombay Presidency and 253 varieties from Bengal were tried this year on a very small area. Only fifteen bunches of each variety were transplanted. The yield from each bed varied from 2 to 8 ozs. The produce has been preserved for sowing in the next year.

The notes as to the characteristics of the Bengal varieties are given in the statement below :—

No.	Name of Variety.	Colour of stem.	Final height.		Length of ear.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In.	Inches.				
1	Uraibutta (old) ...	White...	2	8	7	30th May.	19th July.	24th Sept.	29th Oct.
2	Samharpuchhi ...	„ ...	3	3	8	Do.	Do.	28th Sept.	30th Oct.
3	Chitrakot (old) ...	Reddish	2	7	6	Do.	Do.	10th Sept.	18th Oct.
4	Sailo	White ..	2	8	6	Do.	Do.	21st Sept.	24th Oct.
5	Sont	„ ...	3	2	8	Do.	Do.	4th Oct.	9th Nov.
6	Chhatri	„ ...	2	7	6	Do.	Do.	27th Sept.	30th Oct.
7	Suwapankhi	„ ...	3	2	8	Do.	Do.	1st Oct.	9th Nov.
8	Dudhkhoa (old) ...	„	2	8	7	Do.	Do.	Do.	1st Nov.
9	Radhavalune (old) ..	„ ...	3	3	10	Do.	Do.	5th Oct.	9th Nov.
10	Ponga	„ ...	3	11	9	Do.	Do.	4th Oct.	Do.
11	Kakeri rice (new) ...	„ ...	3	0	7	Do.	Do.	23rd Aug.	31st Oct.
12	Amagoli	Reddish	3	6	10	Do.	Do.	20th Sept.	Do.
13	Chinnor	„	3	0	10	Do.	Do.	12th Oct.	16th Nov.
14	Telasi	Greenish	2	4	6	Do.	Do.	14th Sept.	16th Oct.
15	Haradgunda	White...	2	8	6	Do.	Do.	25th Sept.	9th Nov.
16	Ponga	„ ..	3	2	9	Do.	Do.	7th Oct.	Do.
17	Tedi	„ ...	2	8	6	Do.	Do.	4th Oct.	Do.
18	Pandhari (old) ...	„ ..	2	5	6	Do.	Do.	27th Sept.	31st Oct.
19	Kari Konj	„ ...	2	5	5	Do.	Do.	8th Oct.	9th Nov.
20	Garar Koth	„ ...	2	4	6	Do.	Do.	7th Oct.	Do.
21	Chipda	„ ...	2	5	6	Do.	Do.	16th Sept	18th Oct.
22	Garadkat	„ ...	2	4	6	Do.	Do.	23rd Sept.	1st Nov.
23	Mahurdheti	„ ...	2	3	6	Do.	Do.	1st Oct.	Do.
24	Chinga	„ ...	2	4	6	Do.	Do.	15th Sept.	16th Oct.
25	Bagmuchhi (old) ...	„ ...	2	11	8	Do.	Do.	13th Sept.	16th Nov.
26	Bhera Kawar	„ ...	3	2	8	Do.	Do.	26th Sept	31st Oct.
27	Rupraj (old)	„ ...	2	7	7	Do.	Do.	1st Oct.	1st Nov.
28	Padamsar	„ ...	2	4	7	Do.	Do.	29th Aug.	29th Sept.
29	Kari Konga	„ ...	2	11	8	Do.	Do.	23rd Sept.	9th Nov.
30	Nonga	„ ...	2	6	6	Do.	Do.	11th Sept.	11th Oct.
31	Sonth	„ ...	2	10	8	Do.	Do.	22nd Sept	31st Oct.
32	Samudrasoakh ...	„ ...	3	9	9	Do.	Do.	30th Sept.	1st Nov.
33	Chinikapur	„ ...	3	0	6	Do.	Do.	28th Sept.	Do.
34	Soosapankh	„ ...	3	0	8	Do.	Do.	29th Sept.	31st Oct.
35	Bhakwa	„ ...	2	9	6	Do.	Do.	3rd Oct.	1st Nov.
36	Chinga (old)	„ ...	2	0	6	Do.	Do.	23rd Aug.	25th Sept.
37	Nagsar	„ ...	2	5	8	Do.	Do.	26th Sept.	9th Nov.
38	Tulsizak	„ ...	2	4	9	Do.	Do.	5th Oct.	Do.
39	Terhi	Greenish	2	9	7	Do.	Do.	1st Oct.	Do.
40	Ramkel	White...	2	6	6	Do.	Do.	28th Sept.	Do.
41	No name	„ ...	2	2	5	Do.	Do.	24th Aug.	Do.
42	„	„ ...	2	6	6	Do.	Do.	1st Oct.	Do.
43	„	„ ...	1	8	5	Do.	Do.	5th Oct.	Do.
44	„	„ ...	2	2	6	Do.	Do.	25th Aug.	4th Oct.
45	„	„ ...	3	4	10	Do.	Do.	10th Oct.	9th Nov.
46	„	„ ...	1	9	5	Do.	Do.	30th Aug.	2nd Oct.
47	„	„ ...	2	0	6	Do.	Do.	3rd Sept.	4th Oct.
48	„	„ ...	2	2	6	Do.	Do.	22nd Sept.	24th Oct.

No.	Name of Variety.	Colour of stem.	Final height.		Length of ear.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In.	Inches.				
49	No name	White...	1	4	5	30th May.	19th July.	8th Oct.	9th Nov.
50	"	Reddish.	1	9	5	Do.	Do.	8th Sept.	11th Oct.
51	"	White...	1	3	6	Do.	Do.	6th Oct.	9th Nov.
52	"	" ...	2	9	8	Do.	Do.	23rd Sept.	1st Nov.
53	"	Reddish.	1	10	5	Do.	Do.	7th Sept.	11th Oct.
54	"	" ...	1	8	5	Do.	Do.	10th Sept.	13th Oct.
55	"	" ...	1	8	5	Do.	Do.	7th Sept.	Do.
56	"	" ...	2	2	6	Do.	Do.	27th Aug.	29th Sept.
57	"	White...	2	0	5	Do.	Do.	21st Sept.	24th Oct.
58	"	" ...	2	4	6	Do.	Do.	3rd Oct.	19th Nov.
59	"	" ...	1	8	6	Do.	Do.	29th Aug.	4th Oct.
60	"	" ...	2	2	7	Do.	Do.	7th Oct.	19th Nov.
61	"	" ...	1	10	6	Do.	Do.	3rd Sept.	5th Oct.
62	"	" ...	1	8	5	Do.	Do.	1st Sept.	2nd Oct.
63	"	" ...	1	7	4	Do.	Do.	9th Sept.	18th Oct.
64	Karuniayalal ...	" ...	2	5	7	Do.	Do.	3rd Oct.	19th Nov.
65	Chatteparneclai ...	" ...	3	4	6	Do.	Do.	20th Sept.	24th Oct.
66	Chavannaga Aryan ...	" ...	3	0	7	Do.	Do.	25th Sept.	1st Nov.
67	Ponnachatta Aryan ...	" ...	2	4	6	Do.	Do.	6th Sept.	23rd Oct.
68	No name	" ...	2	10	8	Do.	Do.	10th Oct.	19th Nov
69	"	" ...	1	5	6	Do.	Do.	21st Sept.	1st Nov.
70	"	" ...	2	5	6	Do.	Do.	17th Sept.	Do.
71	"	" ...	2	8	7	Do.	Do.	1st Oct.	19th Nov.
72	"	" ..	2	7	5	Do.	Do.	25th Sept.	2nd Nov.
73	"	" ...	2	6	6	Do.	Do.	20th Sept.	Do.
74	"	" ...	3	0	7	Do.	Do.	12th Sept.	Do.
75	"	" ...	2	10	8	Do.	Do.	27th Sept.	Do.
76	"	" ...	3	0	9	Do.	Do.	26th Sept.	19th Nov.
77	"	" ...	2	5	6	Do.	Do.	25th Sept.	2nd Nov.
78	"	" ...	3	1	6	Do.	Do.	10th Sept.	Do.
79	Karanai sora (Bankral)	" ...	2	10	7	Do.	Do.	27th Sept.	19th Nov.
80	Kamal Bhog ...	" ...	3	0	9	Do.	Do.	11th Oct.	Do.
81	Ramsal	" ...	3	3	7	Do.	Do.	10th Oct.	26th Nov.
82	Mota Balane ...	Reddish.	3	2	9	Do.	Do.	6th Oct.	19th Nov.
83	Pankharas	White...	3	3	7	Do.	Do.	7th Oct.	26th Nov.
84	Bhoourhi sylhet ...	" ...	2	10	9	Do.	Do.	3rd Oct	19th Nov.
85	Lanimi Bhandar ...	" ...	2	5	7	Do.	Do.	23rd Sept.	Do.
86	Bank Tulsi	" ...	2	5	5	Do.	Do.	9th Oct.	26th Nov.
87	Hoorie (heavier yield)	" ...	2	5	8	Do.	Do.	Do.	Do.
88	Palnai Nabason ...	Reddish.	2	9	6	Do.	Do.	3rd Oct.	19th Nov.
89	Bankari	" ...	3	4	7	Do.	Do.	8th Oct.	26th Nov.
90	Yatukulma	" ...	2	8	6	Do.	Do.	12th Sept.	21st Oct.
91	Marich Shal	White...	2	2	7	Do.	Do.	3rd Oct.	19th Nov.
92	PatnaiBhoginal ...	" ...	2	4	7	Do.	Do.	10th Oct.	Do.
93	Sylhet	Reddish.	2	2	5	Do.	Do.	Do.	21st Nov.
94	Kumrah Gorh ...	White...	2	10	7	Do.	Do.	3rd Oct.	Do.
95	Kamal Bhog	" ...	2	5	6	Do.	Do.	13th Oct.	Do.
96	Hari Mayee	" ...	1	11	5	Do.	Do.	Do.	Do.
97	Golap Saru	" ...	2	4	6	Do.	Do.	10th Oct.	Do.
98	Kusumsal	" ...	2	6	7	Do.	Do.	14th Oct.	Do.
99	Badsha Bhoy ...	" ...	2	11	9	Do.	Do.	13th Oct.	Do.
100	Kalam Kathee ...	" ...	2	6	7	Do.	Do.	17th Oct.	27th Nov.

No.	Name of Variety.	Colour of stem.	Final height.		Length of ear.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In.	Inches.				
101	Marich Sal	White...	2	10	7	30th May.	19th July.	8th Oct.	16th Nov.
102	Dhulay Meti ...	„ ...	2	6	8	Do.	Do.	11th Oct.	Do
103	Chandan Sal	„ ...	2	7	7	Do.	Do.	Do.	Do.
104	Sagha Bitchi Patni ...	Reddish.	2	9	9	Do.	Do.	Do.	Do.
105	Baguri	„ ...	3	4	9	Do.	Do.	Do.	Do.
106	Ramashal	White...	3	5	10	Do.	Do.	8th Oct.	Do.
107	Nilkanth	Blue ...	2	10	8	Do.	Do.	12th Oct.	Do.
108	Dadahal	White .	2	10	7	Do.	Do.	9th Oct.	26th Nov.
109	Dhaleakalum ...	„ ...	3	5	10	Do.	Do.	10th Oct.	21st Nov.
110	Banakchur	„ ...	3	2	8	Do.	Do.	12th Oct.	Do.
111	Kalmisal	„ ...	2	10	9	Do.	Do.	8th Oct.	Do.
112	Bona	„ ...	2	9	7	Do.	Do.	9th Oct.	Do.
113	Madhu Malti ...	„ ...	2	7	8	Do.	Do.	8th Oct.	Do.
114	Mogi Balam	„ ...	2	11	9	Do.	Do.	6th Oct.	Do.
115	Nagra	„ ...	2	10	8	Do.	Do.	10th Oct.	Do.
116	Marich Sal	„ ...	2	10	9	Do.	Do.	11th Oct.	Do.
117	Hingcheyloga ...	„ ...	3	0	9	Do.	Do.	10th Oct.	Do.
118	Bans Gogal	„ ...	2	6	7	Do.	Do.	Do.	Do.
119	Melegorh	Reddish.	2	5	6	Do.	Do.	26th. Aug.	4th Oct.
120	Bank Chur	White	2	8	5	Do.	Do.	9th Oct.	21st Nov.
121	Panik Sal	„ ...	2	7	6	Do.	Do.	11th Oct.	Do.
122	Gonth	„ ...	3	0	7	Do.	Do.	9th Oct.	Do.
123	Dadhiynoun ...	„ ...	3	0	6	Do.	Do.	23rd Sept.	Do.
124	Salaybat	„ ...	2	11	6	Do.	Do.	11th Oct.	Do.
125	Sita Sal	Reddish.	2	6	9	Do.	Do.	5th Oct.	Do.
126	Gandheswari ...	White...	2	7	7	Do.	Do.	Do.	Do.
127	Mani Bhog	„ ...	3	4	9	Do.	Do.	8th Oct.	Do.
128	Utturia Sal	„ ...	3	3	8	Do.	Do.	11th Oct.	Do.
129	Kanak Chur	„ ...	2	10	10	Do.	Do.	3rd Oct.	26th Nov.
130	Lona	„ ...	2	10	7	Do.	Do.	8th Oct.	22nd Nov.
131	Rupshal	„ ...	2	10	7	Do.	Do.	5th Oct.	Do.
132	Mahipat	Reddish.	2	7	7	Do.	Do.	9th Oct.	Do.
133	Uthuriakhna ...	„	3	2	8	Do.	Do.	8th Oct.	Do.
134	Chiby	White...	2	3	6	Do.	Do.	10th Oct.	Do.
135	Kanakchur	„ ...	2	6	6	Do.	Do.	12th Oct.	Do.
136	Bolam	„ ...	3	8	9	Do.	Do.	2nd Oct.	Do.
137	Rupshal	„ ...	3	5	8	Do.	Do.	12th Oct.	Do.
138	Bankchur	„ ...	2	11	9	Do.	Do.	8th Oct.	Do.
139	Karmoul	„ ...	2	7	8	Do.	Do.	6th Oct.	Do.
140	Rupsal	„ ...	3	4	8	Do.	Do.	8th Oct.	Do.
141	Gayabahi	„ ...	3	0	8	Do.	Do.	11th Oct.	26th Nov.
142	Katwhoby	„ ...	2	11	9	Do.	Do.	8th Oct.	22nd Nov.
143	Avat	„ ...	2	4	6	Do.	Do.	5th Sept.	2nd Nov.
144	Shankchur	„ ...	2	8	9	Do.	Do.	18th Oct.	1st Dec.
145	Bhankni	„ ...	3	6	7	Do.	Do.	7th Oct.	22nd Nov.
146	Kelaybankchur ...	„ ...	2	10	7	Do.	Do.	25th Sept.	2nd Nov.
147	Bankemoti	„ ...	2	6	9	Do.	Do.	16th Oct.	23nd Nov.
148	Khijoor Chari ...	„ ...	2	5	6	Do.	Do.	14th Oct.	1st Dec.
149	Dudkalma	„ ...	3	2	7	Do.	Do.	18th Oct.	26th Nov.
150	Thara	Reddish.	3	5	8	Do.	Do.	10th Oct.	22nd Nov.
151	Goyabali	White...	2	10	7	Do.	Do.	18th Oct.	26th Nov.
152	Saban	„ ...	2	9	8	Do.	Do.	Do.	Do.

No.	Name of Variety.	Colour of stem.	Final height.		Length of ear.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In.	Inches.				
153	Bank Tulsi	White...	2	10	7	30th May.	19th July.	11th Oct.	26th Nov.
154	Khushkhani or Shitghhoga.	„ ...	2	3	5	Do.	Do.	10th Oct.	22nd Nov.
155	Katmanu	„ ...	3	2	8	Do.	Do.	8th Oct.	Do.
156	Kanakchur	„ ...	2	11	9	Do.	Do.	11th Oct.	27th Nov.
157	Patnai (long) ...	„ ...	2	6	7	Do.	Do.	10th Oct.	22nd Nov.
158	Changoasal ...	„ ...	2	10	7	Do.	Do.	Do.	23rd Nov.
159	Panlay	Reddish.	3	3	8	Do.	Do.	11th Oct.	26th Nov.
160	Sarobati	White...	2	4	6	Do.	Do.	Do.	23rd Nov.
161	Govind Bhoj ..	„ ..	2	4	7	Do.	Do.	15th Oct.	Do.
162	Balam	„ ...	2	4	6	Do.	Do.	Do.	Do.
163	Kamini Saru ...	„ ...	2	1	5	Do.	Do.	Do.	Do.
164	Badshalbhog ...	„ ...	2	4	5	Do.	Do.	14th Oct.	Do.
165	Yamai Lara	„ ...	2	10	7	Do.	Do.	5th Oct.	Do.
166	Hati-Sal	„ ...	2	7	6	Do.	Do.	12th Oct.	Do.
167	Dadkhani	„ ...	2	11	8	Do.	Do.	Do.	26th Nov.
168	Kali Mane	„ ...	2	2	5	Do.	Do.	8th Oct.	Do.
169	Piprebank	Reddish.	2	5	6	Do.	Do.	27th Aug.	4th Oct.
170	Ora	White...	3	0	8	Do.	Do.	13th Oct.	26th Nov.
171	Kanakchur	„ ...	2	6	6	Do.	Do.	5th Oct.	Do.
172	Ash Kul	„ ...	2	11	7	Do.	Do.	9th Oct.	Do.
173	Jhiggu Sal	Reddish.	2	8	6	Do.	Do.	12th Oct.	Do.
174	Muoguray	„ ...	2	3	7	Do.	Do.	Do.	Do.
175	Khair Mori	White...	2	9	8	Do.	Do.	12th Oct.	Do.
176	Lal Kalama	Reddish.	2	10	7	Do.	Do.	10th Oct.	Do.
177	Karbi Rangi ...	White...	2	7	5	Do.	Do.	8th Oct.	Do.
178	Badshabhog	„ ...	2	3	6	Do.	Do.	12th Oct.	Do.
179	Sunder Mukhi ...	„ ...	2	10	7	Do.	Do.	10th Oct.	Do.
180	Laxmi Kajal	„ ...	2	11	8	Do.	Do.	15th Oct.	Do.
181	Mow	„ ...	2	10	8	Do.	Do.	12th Oct.	18th Nov.
182	Amon	„ ...	2	3	6	Do.	Do.	10th Oct.	Do.
183	Mardu Raj	„ ...	2	8	6	Do.	Do.	9th Oct.	Do.
184	Dhali	„ ...	2	10	6	Do.	Do.	4th Oct.	Do.
185	Bonbota	„ ...	2	10	7	Do.	Do.	19th Sept.	30th Oct.
186	Khirshey bhog ...	„ ...	2	8	9	Do.	Do.	4th Oct.	18th Nov.
187	Paddi Shal	„ ...	3	4	9	Do.	Do.	14th Oct.	Do.
188	Horkul	Reddish.	2	7	6	Do.	Do.	10th Oct.	Do.
189	Gandhia Viraja ...	„ ...	2	5	10	Do.	Do.	6th Oct.	Do.
190	Songra	„ ...	3	0	9	Do.	Do.	12th Oct.	26 th Nov.
191	Begum Bichy ...	„ ...	3	0	9	Do.	Do.	4th Oct.	18th Nov.
192	Bhathi Sal	„ ...	2	10	8	Do.	Do.	15th Oct.	Do.
193	Madan Mohan ...	White...	3	0	8	Do.	Do.	10th Oct.	Do.
194	Magan Shal	Reddish.	3	5	9	Do.	Do.	Do.	Do.
195	Gandha Malti ...	White...	3	1	10	Do.	Do.	14th Oct.	Do.
196	Megi Rani	„ ...	3	1	7	Do.	Do.	12th Oct.	26th Nov.
197	Pairanri	Reddish.	3	1	9	Do.	Do.	10th Oct.	18th Nov.
198	Randhani Pagal ...	„ ...	3	0	9	Do.	Do.	12th Oct.	Do.
199	Khepu	„ ...	2	10	8	Do.	Do.	10th Oct.	Do.
200	Laxmi Bilas ...	White...	3	4	8	Do.	Do.	3rd Oct.	Do.
201	Hingchug Loghu ...	Red ...	3	5	7	Do.	Do.	9th Oct.	Do.
202	Bana futi	„ ...	3	3	8	Do.	Do.	Do.	Do.
203	Lalkalma	Reddish.	3	5	9	Do.	Do.	3rd Oct	Do.

No.	Name of Variety.	Colour of stem.	Final height.		Length of car.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In.	Inches.				
204	Karlick Rangi ...	White ..	3	0	9	30th May.	19th July.	8th Oct.	26th Nov.
205	Monlata	„ ...	3	5	7	Do.	Do.	10th Oct.	Do.
206	Parabat Rangi ...	„ ...	2	10	6	Do.	Do.	8th Oct.	Do.
207	Yamai Laru	„ ...	2	9	8	Do.	Do.	23rd Sept.	Do.
208	Haunya Kuli ...	„ ...	3	4	9	Do.	Do.	6th Oct.	Do.
209	Kenla Shal	Reddish.	2	6	5	Do.	Do.	Do.	27th Nov.
210	Govind bhog ...	Greenish	3	4	9	Do.	Do.	4th Oct.	Do.
211	Shamoti	White...	2	10	6	Do.	Do.	2nd Oct.	Do.
212	Murara Shati ...	„ ...	2	8	6	Do.	Do.	13th Oct.	Do.
213	Kalindi	Reddish.	3	2	6	Do.	Do.	3rd Oct.	Do.
214	Parabat Gira ...	White...	2	10	8	Do.	Do.	8th Oct.	Do.
215	Kale Gira	„ ...	3	9	10	Do.	Do.	4th Oct.	Do.
216	Horin Khura ...	„ ...	2	7	7	Do.	Do.	7th Oct.	Do.
217	Bans Mugoor ...	„ ...	2	8	5	Do.	Do.	11th Oct.	1st Dec.
218	Kala Moti	Reddish.	2	11	8	Do.	Do.	12th Oct.	27th Nov.
219	Kocho	White...	2	6	7	Do.	Do.	11th Oct.	1st Dec.
220	Paramsal	„ ...	2	4	8	Do.	Do.	Do.	27th Nov.
221	Alegi	„ ...	2	10	8	Do.	Do.	14th Oct.	1st Dec.
222	Durga Megi	„ ...	2	6	6	Do.	Do.	Do.	Do.
223	Mala Bati	„ ...	2	3	6	Do.	Do.	Do.	Do.
224	Keley Bokrah ..	„ ...	2	5	5	Do.	Do.	12th Oct.	Do.
225	Piprueshal	„ ...	2	0	5	Do.	Do.	5th Sept.	2nd Nov.
226	Baldar	Reddish.	2	8	5	Do.	Do.	9th Oct.	27th Nov.
227	Longra	White...	2	10	8	Do.	Do.	12th Oct.	Do.
228	Tat Mugoor	„ ...	2	10	8	Do.	Do.	13th Oct.	1st Dec.
229	Mahipal	„ ...	3	4	10	Do.	Do.	7th Oct.	17th Nov.
230	Sowera	Reddish.	3	2	10	Do.	Do.	22nd Sept.	Do.
231	Gagameli	White...	2	11	9	Do.	Do.	10th Oct.	Do.
232	Black Ambemohor Girga.	Greenish	2	10	7	Do.	Do.	3rd Oct.	Do.
233	Ambarsali	White...	3	2	8	Do.	Do.	13th Oct.	Do.
234	Lhaba Mugud ...	„ ...	3	1	8	Do.	Do.	22nd Sept.	3rd Oct.
235	Kothimbir Sali ...	„ ...	2	10	9	Do.	Do.	10th Sept.	17th Nov.
236	Lhaba Mugud ...	„ ..	3	2	9	Do.	Do.	25th Sept.	30th Oct.
237	Antu Sali	Reddish.	4	5	10	Do.	Do.	4th Sept.	17th Nov.
238	White Ambemohor ...	White...	3	9	10	Do.	Do.	13th Sept.	Do.
239	Mal-dodga	„ ...	2	10	8	Do.	Do.	9th Sept.	13th Oct.

The rest of the Bengal varieties did not germinate.

The following statement gives similar notes for the 54 varieties of this Presidency :—

No.	Name of Variety.	Colour of stem.	Final height.		Length of ear.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In	Inches.				
1	7 Ambemohor Halva...	White...	2	9	6	30th May.	21st July.	29th Sept.	5th Nov.
2	9 Halva Ambemohor...	„ ...	3	0	7	Do.	Do.	19th Sept.	Do.
3	20 Ambemohor Garva..	„ ...	2	7	8	Do.	Do.	10th Oct.	16th Nov.
4	45 Ambemohor Lámboda.	„ ...	2	10	9	Do.	Do.	25th Sept.	Do.
5	49 Amoemohor Botka..	„ ...	3	2	9	Do.	Do.	23rd Sept.	Do.
6	50 Konkani Garva ...	„ ...	2	10	9	Do.	Do.	6th Oct.	Do.
7	51 Konkani Halva ...	„ ...	2	5	7	Do,	Do.	18th Sept.	5th Nov.
8	54 Kamod	„ ...	3	4	7	Do.	Do.	26th Sept.	16th Nov.
9	48 Koned	„ ...	2	5	9	Do.	Do.	1st Oct.	5th Nov.
10	12 Ghudya Suni Garva	„ ...	3	5	10	Do.	Do.	26th Sept	Do.
11	13 Tulsia Suni Garva...	„ ...	2	10	8	Do.	Do.	19th Sept.	23rd Oct.
12	25 Rájáwal Garva ...	„ ...	3	2	8	Do.	Do.	30th Sept.	5th Nov.
13	28 Bodka Garva ...	„ ...	2	10	9	Do.	Do.	4th Oct,	Do.
14	6 Halva Mahádi ...	„ ...	2	3	5	Do.	Do.	21st Sept.	24th Oct.
15	19 Garvi Patni ...	Red ...	2	8	8	Do.	Do.	11th Oct.	10th Nov.
16	17 Garva Dodka ...	„ ...	3	4	10	Do.	Do.	4th Oct.	Do.
17	18 Málbhát Halva ...	„ ...	2	4	5	Do.	23rd July.	18th Sept.	16th Nov.
18	26 Nirpunji Garva ...	White...	2	5	5	Do.	Do.	4th Oct.	14th Nov.
19	18 Kachora Garva ...	„ ...	2	2	6	Do.	Do.	25th Sept.	Do.
20	44 Káli Sál ...	„ ...	2	8	7	Do.	Do.	4th Oct.	Do.
21	52 Chiman Sál ...	„ ...	2	5	5	Do.	Do.	3rd Oct.	Do.
22	42 Sál White ...	„ ...	2	6	6	Do.	Do.	29th Sept.	24th Oct.
23	40 Dangi or Dánger ...	Reddish.	2	7	8	Do.	Do.	19th Sept.	7th Nov.
24	23 Ghosálwel Garva ...	White...	2	10	7	Do.	Do.	25th Sept.	Do.
25	4 Ghosáwel ...	„ ...	2	4	6	Do.	Do.	6th Sept.	15th Oct.
26	1 Tám Sál Halva ...	„ ...	2	7	6	Do.	Do.	17th Sept.	24th Oct.
27	22 Tavsál Garvi ...	„ ...	3	1	5	Do.	Do.	2nd Oct.	7th Nov.
28	53 Támb Kudai ...	„ ...	3	0	7	Do.	Do.	17th Sept.	24th Oct.
29	41 Welchi	Reddish.	2	8	6	Do.	Do.	7th Sept.	15th Oct.
30	46 White Kolamba ...	White...	2	11	7	Do.	Do.	2nd Oct.	8th Nov.
31	43 Kamod Jiri Patni...	Reddish.	2	2	5	Do.	Do.	10th Oct.	14th Nov.
32	30 Bárka Kolamba ..	White...	2	6	8	Do.	Do.	5th Oct.	Do.
33	29 Zina Kolamba ...	„ ...	1	11	6	Do.	Do.	6th Oct.	Do.
34	27 Mahádya Varangal	„ ...	2	5	6	Do.	Do.	10th Oct.	8th Nov.
35	21 Sonwel Garva ...	„ ...	2	2	5	Do.	Do.	Do.	14th Nov.
36	16 Bárki Mahádi ...	„ ...	2	4	5	Do.	Do.	5th Oct.	Do.
37	31 Dodka	Red ...	2	5	6	Do.	Do.	10th Oct.	13th Nov.
38	33 Kudurthi (Thana)..	„ ...	2	4	6	Do.	Do.	17th Sept.	17th Oct.
39	47 Thin Paki Kudai ...	White...	2	4	6	Do.	Do.	4th Oct.	14th Oct.
40	3 Halvar Halva ..	„ ...	2	4	6	Do.	Do.	21st Sept.	16th Nov.
41	5 Bhadas Halva ...	„ ...	2	8	6	Do.	Do.	18th Sept.	16th Oct.
42	10 Halvi Patni ...	„ ...	2	6	6	Do.	Do.	23rd Sept.	16th Nov.
43	11 Dodka Suni Garva...	Red ...	2	7	6	Do.	Do.	16th Sept.	14th Nov.
44	32 Dodka (Khadakwásla).	„ ...	2	8	6	Do.	Do.	17th Sept.	17th Oct.
45	34 Patni (Thana) ...	White...	2	10	8	Do.	Do.	21st Sept.	24th Oct.
46	36 Torna (Thana) ...	„ ...	2	7	6	Do.	Do.	8th Sept.	16th Oct.
47	39 Bhura	„ ...	2	8	6	Do.	Do.	17th Sept.	24th Oct.

No.	Name of Variety.	Colour of stem.	Final height.		Length of ear.	Date of sowing.	Date of transplanting.	Date of flowering.	Date of harvesting.
1	2	3	4		5	6	7	8	9
			Ft.	In.	Inches.				
48	14 Hemdi	Reddish.	3	2	7	30th May.	23rd July.	23rd Sept.	7th Nov.
49	15 Khári Patni ...	Red ...	3	1	7	Do.	Do.	5th Oct.	Do.
50	24 Jáda Kolamba ...	White...	2	11	8	Do.	Do.	4th Oct.	Do.
51	2 Mahádi	Red ...	2	4	5	Do.	Do.	19th Sept.	17th Oct.
52	35 Mahádi	Reddish.	2	3	6	Do.	Do.	22nd Sept.	24th Oct.
53	37 Ráta	„ ...	2	4	6	Do.	Do.	10th Sept.	17th Oct.
54	38 Munda Ráta ...	White...	2	3	7	Do.	Do.	15th Sept.	16th Nov.

12. Fourteen selected varieties of the Bombay rice were grown on a little larger area (2 gunthas for each variety). The outturn results from field plots as well as from seed-beds are tabulated below :—

Field No.	Plot No.	Name of Variety.	Kind of treatment.	Cost per acre.			Outturn per acre.		
				Cost of raising seedlings.	Cost of cultivation in the transplanted area.	Total cost of cultivation.	Grain.	Straw.	Total value of Outturn.
16		*Field plots.*		Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.
	1	Bárka Mahádya ...	Cowdung ráb.	37 13 8	12 13 8	50 11 4	1,080	1,400	41 0 6
	2	Garva Dodka ...					1,040	1,440	40 0 0
	3	Támsál Garvi ...					800	800	29 2 6
	4	Patni					680	1,280	27 14 6
	5	Mahádi					840	1,200	32 8 0
	6	Káli Sál					1,040	1,120	38 5 3
	7	Ambemhor Lámboda ...					960	1,400	37 4 6
	8	Zina Kolamba ...					1,080	1,280	40 6 6
	9	Dodka					920	1,200	35 0 0
	10	Kamod Jiri Patni ...					800	1,200	31 4 0
	11	Chiman Sál ...					1,000	1,280	37 14 6
	12	Kamod					907	1,067	33 14 3
	13	Tin Paki Kudai ...					853	1,013	31 14 9
	14	Ambemohor ...					1,280	1,440	47 8 0
14		*Seed-beds.*							
	1	Bárka Mahádya ...	Cowdung ráb.	37 13 8	3 3 5	41 1 1	2,000	1,600	70 13 0
	2	Garva Dodka ...					1,440	2,400	57 8 0
	3	Támsál Garvi ...					1,600	1,600	58 5 0
	4	Patni					880	1,760	36 10 6
	5	Mahádi					960	1,760	39 2 6
	6	Káli Sál					1,600	2,000	60 6 6
	7	Ambemohor Lámboda...					2,000	2,560	75 13 3
	8	Zina Kolamba ...					2,000	1,600	70 13 0
	9	Dodka					1,520	1,920	57 8 0
	10	Kamod Jiri Patni ...					1,360	1,920	52 8 0
	11	Chiman Sál ...					1,680	2,880	67 8 0
	12 to 14	No seedlings remained after transplanting for these seed-bed plots.							

13. In the present season, weights (dry) were taken of the seedlings from differently treated plots. The statement below gives details:—

Treatment.	Average weight of seedlings (in grammes)			
	in each of the triplicate plots.			Mean of all.
	A.	B.	C.	
	Weight per plant.			
Safflower cake	0·4097	0·4967	...	0·4532
Ain ráb	0·0879	...	...	0·0879
Mixed branches ráb	0·2181	0·1708	0·1430	0·1773
Ashes of mixed branches ráb ...	0·0797	0·1094	0·0954	0·2948
Cowdung ploughed in	0 0928	0·0772	...	0·0850
Cowdung ráb	0·2561	0·3172	...	0·2866
Earth pulverised	0 0909	0·0625	0·1000	0·0845
Earth heated	0·3562	0·2968	0·2276	0·2935

In the case of the "earth heated" plot the soil was excavated to a depth of 3 inches, spread on iron sheets and heated from below to a temperature of between 200° and 230° F. The soil was on the sheets for a period of about an hour before this temperature was reached. After cooling down it was replaced in the seed-beds.

Probably neither the "earth heated" plot nor the rábed plots did as well as they would ordinarily have done owing to the fact that the soil was moist, an unseasonable shower having fallen a few days before the date of burning. This undoubtedly prevented the earth in all cases being heated to so high a temperature as ordinarily.

Experiments off the Station.

14. Experiments were continued as last year on cultivators' fields in Karjat, Kalyán and Salsette Tálukas.

Name of the village and district.		Number of plots.	Area treated.
Kola'ba District.			Gunthas.
Bhansoli ...	Táluka Karjat ...	12	12
Chincholi ...		19	28
Tha'na District.			
Maharal ...	Táluka Kalyán ...	18	18
Kambe ...		9	18
Kalve ...	Táluka Sálsette ...	27	27

The selection of site was made in the month of May and the plots were measured by the Circle Inspectors.

15. The following varieties of rice were grown in the manured fields :—

Name of place.	Name of variety.
Bhansoli ...	Kolamba and Halvi Patni.
Chincholi ...	
Maharal ...	Dodka and Kolamba.
Kambe ...	
Kalve ...	

The manures were applied to the fields in the month of August—in Karjat on the 3rd; in Kalyán on the 8th and in Sálsette on the 10th and 11th August. The seedlings were well established at the time of the application of the manure.

Throughout the growth of the crop there was enough of rain, but was rather insufficient at the time of the formation of seed.

The statement below shows the details.

Name of village.	Survey No.	Plot No.	Name of rice variety tried.	Kind of manure.	Quantity of manure applied per acre.	Value of manure.	Outturn per acre. Grain.	Outturn per acre. Straw.	Value of outturn.
1	2	3	4	5	6	7	8	9	10
				Karjat Series.	Lbs.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.
ansoli ...	21	1	Halvi-Patni .	Nitre ...	500	50 0 0	2,040	3,040	51 14 2
		7		Do. ...	500	50 0 0	1,960	3,200	50 1 4
		2	Do. ...	Chili Saltpetre ...	192	21 15 5	1,520	2,400	38 12 4
		8		Do. ...	192	21 15 5	2,200	3,360	56 0 4
		3	Do. ...	Sulphate of Potash ...	62	5 8 0	2,040	3,250	53 1 4
		9		Do. ...	62	5 8 0	1,920	3,320	40 3 5
		4	Do	Superphosphate ...	65	5 8 4	1,760	2,560	44 11 4
		10		Do. ..	65	5 8 4	1,760	3,040	45 1 9
		5	Do. ...	Safflower cake ...	728	24 4 3	1,840	2,500	46 9 7
		11		Do. ...	728	24 4 3	2,080	3,240	53 0 4
		6	Do. ...	No manure ...	...	...	2,040	3,160	52 0 2
		12		Do. ..	...	...	1,600	2,520	40 12 11
		13	Kolamba-Garva	Chili Saltpetre ...	192	21 15 5	2,120	3,120	56 11 4
		18		Do. ...	192	21 15 5	2,240	3,800	70 14 6
		14	Do. ...	Sulphate of Potash ...	62	5 8 0	2,000	3,240	68 2 10
		19		Do. ...	62	5 8 0	2,240	3,680	70 12 10
		15	Do. ...	Superphosphate ...	65	5 8 4	1,920	3,000	60 14 2
		20		Do. ..	65	5 8 4	2,320	3,260	72 15 3
		16	Do. ...	Safflower cake ...	728	24 4 3	2,280	3,720	72 0 10
		21		Do. ...	728	24 4 3	2,160	3,600	68 5 2
		17	Do. ...	No manure ...	...	...	1,880	3,040	59 6 2
		22	Do. ...	Do. ...	...	...	2,000	3,280	63 3 4
inehol ...	31 Pot No. 1.	23	Do. ...	Nitre ...	500	50 0 0	1,880	2,600	59 0 4
		24	Do. ...	Chili Saltpetre ...	192	21 15 5	1,860	2,520	58 5 7
		25	Do. ...	Sulphate of Potash ...	62	5 8 0	1,860	2,660	58 7 5
		26	Do. ...	Superphosphate ..	62	5 8 4	1,860	2,520	58 5 7
		27	Do. ...	Ammonium Sulphate ..	144	13 0 0	2,200	2,680	68 12 2
		28	Do. ...	Safflower cake ...	73	24 4 3	...	...	...
		29	Do. ...	Sulphate of Potash ...	62	5 8 0	2,260	2,760	68 3 7
		30	Do. ...	Superphosphate ...	65	5 8 4	...	...	...
		31	Do. ...	Safflower cake ...	728	24 4 3	2,300	2,760	71 14 11
		32	Do.	No manure (in duplicate).	...	...	1,840	2,640	57 13 5
		33	Do.				1,780	2,580	5 15 7

Name of village.	Survey No.	Plot No.	Name of rice variety tried.	Kind of manure.	Quantity of manure applied per acre.	Value of manure.	Outturn per acre. Grain.	Outturn per acre. Straw.	Value of outturn.
1	2	3	4	5	6	7	8	9	10
					Lbs.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.
				Kalya'n Series.					
Maharal ...	42	34	Dodka-Garva ...	Nitre ...	500	50 0 0	2,080	3,000	55 5 1
		35	Do. ...	Chili Saltpetre ..	192	21 15 5	1,920	2,600	50 12 6
		36	Do. ...	Sulphate of Potash ...	62	5 8 0	1,760	2,320	46 7 1
		37	Do. ...	Superphosphate ..	65	5 8 4	2,000	2,400	52 6 2
		38	Do. ...	Ammonium Sulphate ...	144	13 0 0	3,040	4,080	80 5 7
		39	Do. ...	Safflower cake ..	728	24 4 3	...	...	...
		...	Do. ...	Sulphate of Potash ...	62	5 8 0	3,600	5,160	95 11 1
		...	Do. ...	Superphosphate ..	65	5 8 4	...	...	...
		40	Do. ...	Safflower cake ..	728	24 4 3	2,240	2,600	58 8 5
		41	Do. ...	Poudrette ...	5,000	20 0 0	2,960	3,800	77 15 1
		42	Do. ...	No manure ...	...	...	2,080	2,480	54 7 3
	74	43	Kolamba-Garva.	Nitre ...	500	50 0 0	1,760	2,920	47 7 1
		44	Do ...	Chili Saltpetre ...	192	21 15 5	1,702	3,000	46 9 9
		45	Do. ...	Sulphate of Potash ...	62	5 8 0	2,000	2,920	53 4 0
		46	Do. ...	Superphophate ...	65	5 8 4	1,920	3,040	51 8 2
		47	Do. ...	Ammonium Sulphate ...	144	13 0 0	1,900	3,020	51 15 11
		48		Safflower cake ...	728	24 4 3			
		...	Do. ...	Sulphate of Potash ...	62	5 8 0	1,920	3,280	51 14 8
		...		Superphosphate ...	65	5 8 4			
		49	Do. ...	Safflower cake ...	728	24 4 3	1,840	3,080	49 10 8
		50	Do. ...	Poudrette ...	5,000	20 0 0	1,400	2,320	37 11 9
		51	Do. ...	No manure ...	...	...	1,800	2,840	48 4 5
Kambe ...	Alienated.	52	Do. ...	Nitre ...	500	50 0 0	2,040	3,020	66 11 7
		53	Do. ...	Chili Saltpetre ...	192	21 15 5	2,080	2,460	67 0 0
		54	Do. ...	Sulphate of Potash ...	62	5 8 0	1,740	2,120	56 4 4
		55	Do. ...	Superphosphate ...	65	5 8 4	3,280	4,080	205 2 11
		56	Do. ...	Ammonium Sulphate ...	144	13 0 0	2,880	4,000	93 9 6
		57		Safflower cake ...	728	24 4 3			
		...	Do. ...	Sulphate of Potash ...	62	5 8 0	3,000	3,780	97 0 5
		...		Superphosphate ...	65	5 8 4			
		58	Do. ...	Safflower cake ...	728	24 4 3	3,660	5,080	38 8 1
		59	Do. ...	Poudrette ...	5,000	20 0 0	2,680	3,420	86 9 3
		60	Do. ...	No manure ...	...	...	2,800	3,200	89 15 10

Name of village.	Survey No.	Plot No.	Name of rice variety tried.	Kind of manure.	Quantity of manure applied per acre.	Value of manure.	Outturn per acre. Grain.	Outturn per acre. Straw.	Value of outturn.
1	2	3	4	5	6	7	8	9	10
				Sa'lsette Series.	Lbs.	Rs. a. p.	Lbs.	Lbs.	Rs. a. p.
Kalve ...	82 Pot No. 2	61	Kolamba-Garva.	Nitre ...	500	50 0 0	1,760	2,480	57 5 8
		62	Do. ...	Chili Saltpetre ...	192	21 15 5	1,760	2,680	57 11 0
		63	Do. ...	Sulphate of Potash ...	62	5 8 0	1,800	2,800	59 2 7
		64	Do. ...	Ammonium Sulphate ...	144	13 0 0	3,040	4,960	100 3 2
		65	Do. ...	Superphosphate ...	65	5 8 4	2,000	2,760	65 1 3
		66		Safflower cake ...	728	24 4 3			
		...	Do. ...	Sulphate of Potash ...	62	5 8 0	2,160	3,440	71 0 10
		...		Superphosphate ...	65	5 8 4			
		67	Do. ...	Safflower cake ...	728	24 4 3	2,000	3,000	65 7 8
		68	Do. ...	Poudrette ...	5,000	20 0 0	3,360	4,920	110 12 11
		69	Do. ...	No manure ...	...	...	1,840	2,880	60 7 0
Kalve ...	172 Pot No. 1	70	Dodka ...	Nitre ...	500	50 0 0	1,680	2,400	54 12 10
		71	Do. ...	Chili Saltpetre ...	192	21 15 5	1,680	2,600	55 2 2
		72	Do. ...	Sulphate of Potash ...	62	5 8 0	1,760	2,760	57 13 2
		73	Do. ...	Superphosphate ...	65	5 8 4	2,080	2,840	67 10 4
		74	Do. ...	Ammonium Sulphate	144	13 0 0	2,960	4,840	97 9 3
		75		Safflower cake ...	728	24 4 3			
		...	Do. ...	Sulphate of Potash, ...	62	5 8 0	2,080	3,440	68 10 4
		...		Superphosphate ...	65	5 8 4			
		76	Do. ...	Safflower cake ...	728	24 4 3	1,960	3,000	64 4 4
		77	Do. ...	Poudrette ...	5,000	20 0 0	3,200	4,680	104 9 6
		78	Do. ...	No manure ...	...	...	1,920	2,880	62 13 9
Kalve ...	103 Pot No. 8	79	Kolamba ...	Superphosphate ...	65	5 8 4	1,560	2,840	58 3 1
		80	Do. ...	Ammonium Sulphate ...	144	13 0 0	1,800	3,040	66 12 1
		81		Safflower cake ...	728	24 4 3			
		...	Do. ...	Sulphate of Potash ...	62	5 8 0	1,760	3,040	65 6 1
		...		Superphosphate ...	65	5 8 4			
		82	Do. ...	Safflower cake ...	728	24 4 3	1,760	3,080	65 7 3
		83	Do. ...	Poudrette ...	5,000	20 0 0	1,920	2,960	70 11 9
		84	Do. ...	No manure ...	...	...	1,600	2,720	59 5 11

16. *Karjat Series.*—The yield of the duplicate plots is nearly equal to one another, while the outturn taken in general averages from 1,700 to 2,300 lbs. of rice per acre.

17. *Kalyán Series.*—The complete manure plot gives the highest outturn. The results of outturn are in favour of the poudrette and ammonium sulphate plots. In survey No. 74 the poudrette manure plot shows very low yield. In the alienated village the safflower cake and superphosphate plots show the best results. The yield in other plots is fair.

18. *Sálsette Series.*—The per acre results of rice in Survey Nos. 82 and 172 are in favour of poudrette and ammonium sulphate plots, while those of nitre, Chili saltpetre and sulphate of potash are comparable. The outturn from the safflower cake plot is moderate. The complete manure plot does not show any appreciable increase in yield. The increased yield in the unmanured plot may be due to the washing of manures from the adjoining plots. When the value of manures is taken into consideration the superphosphate plot shows better results. The outturn in field No. 103 is proportionately low as compared with the above fields.

19. It is impossible to draw conclusions of any kind from these experiments, the variations between duplicate plots being often greater than between either of the plots and the "no-manure" plot. The plots are too small ($\frac{1}{40}$ acre usually) and the difference in the water-supply probably produce a greater effect than differences in the manure applied. The figures are given for what they are worth.

Poona,
September 1907.

F. FLETCHER,
Acting Professor of Agriculture.

BOMBAY: PRINTED AT THE GOVERNMENT CENTRAL PRESS.

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ANNUAL REPORT

ON THE

EXPERIMENTAL WORK

OF THE

SURAT AGRICULTURAL STATION

(Surat District, Gujarát)

FOR THE YEAR

1906-1907

BY

F. FLETCHER, M.A., B.Sc., ETC.,
Deputy Director of Agriculture.

BOMBAY
PRINTED AT THE GOVERNMENT CENTRAL PRESS
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List of Vernacular names of crops mentioned in the Report together with their Botanical and English equivalents.

Botanical.	English.	Vernacular.
Cereals.		
Andropogon sorghum var. vulgare ...	Great millet ...	Jowár (Chapti, Perio, Sholápuri).
Do. var. cernuum ...	Do. ...	Sundhia.
Pennisetum typhoideum ...	Bulrush millet ...	Bájri.
Triticum sativum ...	Wheat ...	Ghau.
Zea mays ...	Maize ...	Makai.
Oryza sativa ...	Rice ...	Dángar.
Pulses.		
Cajanus indicus ..	Pigeon pea ...	Tuver, Tur.
Phaseolus radiatus ...	Black gram. ...	Udid, Adad.
Vigna catiang ...	Chinese bean ...	Chavli, Chola.
Cyamopsis psoralioides ...	Field vetch ...	Guvár.
.....	Saidi beans	.....
Oil-seeds.		
Sesamum indicum ...	Sesamum ...	Tal.
Arachis hypogea ...	Groundnut ...	Bhoising.
Fibre Plants.		
Gossypium herbaceum ...	Cotton ...	Deshi Kapás (Broach, Ghoghári, etc.).
Crotolaria juncea ..	Bombay hemp ...	San.
Sugars.		
Sachharum officinarum ...	Sugarcane ...	Shardi.
Grasses.		
Medicago sativa ...	Lucerne ...	Lasun Ghás.
Panicum jumentorum ...	Guinea grass ...	... ..
Miscellaneous.		
Zingiber officinale ...	Ginger ...	Adu.

THE SURAT AGRICULTURAL STATION, 1906-07.

Established—1896; *North Latitude*—21° 12′; *East Longitude*—72° 52′; *Elevation*—Approximately sea level; *Soil*—Black cotton; *Average rainfall*—38′ 42″; *Temperature*—Maximum 106° in May, minimum 51° in February.

Area.—84 acres arable and 150 acres pasture.

Superintendent.—Mr. Bhimbhái Morárji Desái.

Season.

	April 1906.	May.	June.	July.	August.	September.	October.	November.	December.	January 1907.	February.	March.	Total.
Rainfall—(1906-07)	′ ″	′ ″	′ ″ 10 6	′ ″ 10 51	′ ″ 7 89	′ ″ 1 61	′ ″ 0 10	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″ 30 17
Average	0 7	0 5	7 55	17 33	6 77	5 6	1 18	0 17	0 5	0 6	0 12	0 1	38 42
Temperature (1906-07)—Mean maximum	104°	96°	91°	87°	83°	92°	94°	93°	88°	89°	81°	94°	
Mean minimum	70°	80°	89°	79°	76°	76°	71°	65°	62°	6.°	63°	68°	

2. In February a little abnormal rain fell which did neither good nor harm. The monsoon burst favourably on the 9th June but the season was on the whole unfavourable. With the exception of a few days, there was rain almost every day till the end of the month. General sowing was, therefore, delayed till the first week of July. During this period, weeds grew unchecked and there was no time left for preparing the fields before sowing.

Weeding and interculturing operations were very much interrupted by continuous rains in July from the beginning of the second week till the end of the month. A very short time was therefore available for kharif sowings, which, together with the fact that the heavy rains had encouraged a vigorous growth of weeds, prevented many fields from being sown. Owing to too much moisture the crops assumed a yellow appearance and many of the germinating plants died, so that some fields had either to be re-sown or the blanks in them filled up by dibbling seed.

Similarly in nearly the whole of August and the first half of September there was more or less rain almost every day, thus seriously interrupting weeding and other agricultural operations

and favouring the growth of weeds. Thus this very long wet weather made the plants moisture-sick, retarded the growth badly and turned them yellow. The total rainfall was only about ¾ths of the average, but the number of rainy days was perhaps unprecedented. The rains stopped abruptly in the middle of September. Want of labour was then badly felt because all agricultural operations including weeding, interculturing and preparing land for winter sowing came on simultaneously.

Owing to the absence of rain in the latter half of September and early half of October both the kharif and rabi crops (especially cotton) suffered to a greater or less extent throughout the district except in the eastern portion of the Mándvi, Bárdoli and Jalálpor Tálukas. The rice crop was in most cases below normal.

Manurial Experiments.

3. The experiments were laid out with a view to see whether costly artificial manures such as nitre, sodium nitrate, ammonium sulphate, etc., could be profitably applied to such dry crops as cotton, Jowár, Tuver and Tal, &c. Owing to abnormal seasons of the previous years no practical conclusions had hitherto been possible.

This year, too, on account of want of one rain towards the close of the monsoon, the cotton crop suffered from want of moisture and failed to give a normal yield. But the crops of Jowar, Tal and Tuver gave a fairly normal yield.

The results were as follows :—

Manure applied per acre.	Yield per acre.												
	Cotton (with seed).			Jowár.						Tal and Tuver.			
				Chapti.		Perio.		Sholápuri.		Tal.*		Tuver.‖	
	Broach.	Broach.	Goghári.	Grain.	Kadbi.	Grain.	Kadbi.	Grain.	Kadbi.	Grain.	Stalks.	Grain.	Chaff.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.		
Sodium Nitrate 100 lbs. + Superphosphate, 400 lbs.	*2a* 399	*3a* 418	*4a* 496	*11a* 1,518	3,978	*12a* 1,488	3,552	*13a* 1,368	3,006	314	661	As practically no grain was obtained the results are omitted.	
Nitre, 160 lbs.	*2b* 335	*3b* 349	*4b* 374	*11b* 1,416	3,150	*12b* 1,248	3,720	*13b* 1,338	3,000	315	570		
No manure	*2c* 318	*3c* 316	*4c* 291	*11c* 1,302	1,902	*12c* 1,188	2,274	*13c* 1,086	1,854	275	514		
Sodium Nitrate, 100 lbs. ...	*2d* 262	*3d* 283	*4d* 290	*11d* 1,398	2,790	*12d* 1,386	2,844	*13d* 1,176	2,088	294	562		
Castor Cake, 600 lbs. ...	*2e* 341	*3e* 346	*4e* 346	*11e* 1,533	3,672	*12e* 1,404	3,588	*13e* 1,206	3,096	358	662		
Farm-yard manure, 5 tons...	*2f* 335	*3f* 287	*4f* 371	*11f* 1,551	2,796	*12f* 1,356	2,598	*13f* 1,272	2,514	344	626		

* These results are the average of Plots Nos. 8, 9 and 10.

Note.—The number of plots and their sub-divisions are shown in *italics*.

Each of the 36 plots was $\frac{1}{6}$ acre in area.

Of the 6 cotton plots, the first three which were better established than the other three, gave superior returns. The superphosphate+sodium nitrate gave the best results. Unlike in the previous years of scant rainfall, the no-manure plots yielded less than any of the manured plots (except the sodium nitrate plot). The sodium nitrate plot has throughout not done so well as the other manured plots, but the results might have been changed to some extent with sufficient rain. A normal rainfall would doubtless have enhanced the increase due to the artificials.

The results due to these manures are more marked in the case of Jowár than cotton. With one more rain the yield would have been still better. The application of sodium nitrate in conjunction with superphosphate has increased the yield of grain by about 25 per cent. and practically doubled the yield of Kadbi.

The Tuver crop was greatly damaged by hares and deer and practically no grain was obtained and hence the results are omitted. The experiments will be continued next year.

The increments due to each of the manures and the cost thereof are given in the following statement.

Kind of Manure.	Cost of Manure.	Results per Acre.								
		Cotton.			Jowár.			Tal.		
		Average value of produce.	Average cost of cultivation.	Profit.	Average value of produce.	Average cost of cultivation.	Profit.	Average value of produce.	Average cost of cultivation.	Profit.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Sodium Nitrate, 100 lbs. ... + Superphosphate, 400 lbs. ...	25 12 0	49 3 0	41 13 9	7 5 3	64 0 1	46 0 1	18 0 0	27 7 7	36 9 3	—9 1 8
Nitre, 160 lbs. ...	7 0 0	39 10 4	23 1 9	15 8 7	60 14 8	27 4 1	33 10 7	27 9 0	17 13 3	9 11 9
No manure ...	...	34 10 10	15 0 6	19 10 4	51 5 4	19 2 10	32 2 6	24 1 6	9 12 3	14 4 9
Sodium Nitrate, 100 lbs. ...	7 0 0	31 4 10	23 1 9	11 3 1	58 1 6	27 4 1	30 13 5	25 11 7	17 13 3	7 12 4
Castor-cake, 600 lbs. ...	7 0 0	38 11 10	23 1 9	15 10 1	62 15 2	27 4 1	35 11 0	31 5 9	17 13 3	13 8 6
Farmyard manure, 5 tons ...	7 0 0	35 2 11	23 1 9	12 1 2	40 15 4	27 4 1	13 11 3	30 1 7	17 13 3	12 4 4

The cost of manure in each case is Rs. 7 per acre except in the case of Sodium Nitrate and Superphosphate, the latter being added afterwards and costing Rs. 18-12-0; the total of Sodium Nitrate and Superphosphate being Rs. 25-12-0. The cost of manure is included in the cost of cultivation.

4. The experiments to test the effect of gypsum with farmyard manure and no manure on Jowár, cotton and Tal plus Tuver were also continued in the year under report. The results were as tabulated below :—

Manure applied per acre.	Yield per acre.						
	Cotton. in seed.	Jowár.		Tal and Tuver mixed.			
				Tal.		Tuver.	
		Grain.	Kadbi.	Grain.	Stalks.	Grain.	Stalks.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Gypsum, 2,000 lbs.	391*	1,039	25 a 1,597	190	457	27 a 4⅝	39
No manure	351	1,063	25 b 1,529	175	472	27 b 2	35
Farm yard manure, 5 tons	291	1,115	25 c 1,795	139	454	27 c 1⅓	38

* Average yield of plots 26 and 28.

In the case of Jowár, the farmyard manure plot has yielded a little better than either the gypsum or no manure plot. The plot gave similar results last year with cotton.

In the case of cotton and Tal plus Tuver, the gypsum plots have yielded best, and the farmyard manure plots the worst just in the same way as these plots did with Jowár and Tuver last year. The difference in yield might possibly be due to the reasons given last year at the end of paragraph 4. The following sketches show the plan of these experiments :—

Experiments in 1905-06.

Farmyard manure.	C Bro	Plot 25 B ach Cott	A on. Gypsum.
	C T	Plot 26 B u v	A o r.
	C Jowár	Plot 27 B and Tuver	A mixed.
	C Tal	Plot 28 B and Tuver	A mixed.

Experiments in 1906-07.

Farmyard manure.	C J	Plot 25 B o w á	A r. Gypsum.
	C Bro	Plot 26 B ach Cott	A on.
	C Tal	Plot 27 B and Tuver	A mixed.
	C Bro	Plot 28 B ach Cott	A on.

5. A plot of Jowár of 30 gunthas manured with superphosphate of lime at the rate of 400 lbs. per acre yielded only 771 lbs. 14 ozs. of grain, which could not pay the extra cost of manure; the yield being only equal to the ordinary yield of a good cultivator. This plot grew cotton last year and was manured with the same manure.

6. *Night-soil Experiments of previous years.*—The plots, as re-arranged last year, were sown with selected seed of Perio Jowár and Bazár Jowár in rotation with the cotton sown last year without further application of manure.

The results are tabulated below :—

Manure applied.	Sub-division of Plot.		Yield per acre.					
			Plot 32.		Plot 33.		Plot 34.	
			X Perio Jowár selected seed.	Y Perio Jowár bazár seed.	X Perio Jowár selected seed.	Y Perio Jowár bazár seed.	X Perio Jowár selected seed.	Y Perio Jowár bazár seed.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Night-soil applied in beds in 1904, but no manure since	A	G.	927	1,232	1,237	1,525	1,153	1,253
		C.	310	256	348	339	292	304
		K.	5,016	3,608	5,261	3,416	3,134	2,512
No manure in 1904, but 20 loads of farm yard manure applied in 1905 to make it even with other plots, no manure since	B	G.	768	752	852	583	692	669
		C.	269	176	235	160	177	144
		K.	1,322	1,200	1,305	960	1,153	1,115
Farmyard manure applied in 1904, but none since	C	G.	1,006	934	855	836	961	999
		C.	303	208	299	239	237	256
		K.	1,827	1,600	1,526	1,312	1,657	1,816
Night-soil applied in trenches made by T. W. plough in 1904, but no manure since	D	G.	1,302	1,277	1,144	1,533	1,251	1,503
		C.	339	307	307	320	307	374
		K.	4,377	2,903	3,885	2,803	2,969	3,440

G. = Grain; C. = Chaff; K. = Kadbi.

Note.—A, B, C, D represent sub-divisions of plots according to the manurial treatment, while X and Y represent the sub-divisions of the plots according to the seed sown; the latter sub-division is made at right angles to the former.

From the above statement it will be seen from the weight of the Kadbi and chaff that the crops grown on the plots treated with night-soil still continue to grow more vigorously and give much better outturns except in the case of plot 32 where it is only 927 lbs.; this is due to want of moisture.

That the results of Bazár seed are better than those of Farm selected seed is due to the impossibility of obtaining an even stand of plants owing to the character of the season. The Bazár seed plots had to be resown while blanks in the selected seed

plots could, owing to lack of surplus seed, only be filled in by transplantation. It was observed that transplanted plants in the no-manure and farmyard manure plots did not fall behind the original plants grown from seed, but this was not so in the case of the night-soil plots where the originally sown plants grew very vigorously and far outstripped those which were transplanted.

It is noticeable in some cases in plots treated with night-soil, that the proportion of Kadbi to grain increases enormously. This was mainly due to the deficiency of one rain at the end of the season; a very forcing manure promotes quick and vigorous growth of the crop and requires therefore more moisture than ordinary manure for its full benefit to be felt. Lastly, the effect of a heavy application of night-soil and farmyard manure is greater in the 3rd year after its application than in the first or 2nd year as will be seen from the fact that the plots which received these in 1904 did better than those which got them in 1905.

From this and last year's results and those of one or two favourable seasons to come, it will be possible, it is hoped, to suggest a practicable and profitable method of applying fresh night-soil to ordinary dry crops even though the application involves fallowing for a season.

7. Another set of manurial experiments on cotton and Jowár with rotted cactus manure and farmyard manure gave the following results:—

Manure applied per acre.	Yield per acre.				
	Cotton.	Jowár.			
		Grain.		Kadbi.	
	Lbs.	Lbs.		Lbs.	
Rotted cactus 5 tons	*15* 122	*C*	*15* 1,760	*B*	3,512
No manure	*16* 177	*B*	*16* 1,480	*A*	3,278
Farmyard manure 5 tons	*17* 169	*B*	*17* 1,640	*A*	3,580

Note.—The figures and letters in italics show the plots and their sub-divisions.

In the case of cotton, the no-manure plot has given better results than either of the manured plots and the farmyard manure plot yielded better than the rotted cactus manure plot.

But in the case of Jowár, the results are different; rotted cactus manure yielded the highest and farm yard manure gave better results than the no manure plot.

This year the rainfall was not deficient for a Jowár crop except in the case of the night-soil plot, but it was so for cotton.

The rotted cactus manure was made from fresh cactus cut and buried in a pit for a full year. The total cost of labour for making a ton of rotted manure came to Rs. 2-2-0, *i. e.*, very nearly the same price as that of farm yard manure near a big town or where cultivators know the value of manure well and pay a good price. But in country districts where farm yard manure can be had cheaply, say about Re. 1 a ton, the cactus manure will be dearer.

The plots under these manures will be continued this year to see the after effects of the manures without adding any fresh supplies.

8. Another manurial experiment on a crop of cotton with ammonium sulphate versus no manure gave the following results:—

No. of plot.	Area.	Crop.	Per acre.			Remarks.
			Manure.	Yield of		
				Seed cotton.	Stalks.	
	A. g.			Lbs.	Lbs.	
30	1 0	Broach cotton ...	Ammonium sulphate 100 lbs.	202	770	On account of want of rain the result is not conclusive.
31	1 0	Do. ...	No manure	187	950	

9. Plots 38*a* and 38*b* which grew Broach Deshi cotton and Perio Jowár respectively were manured with ammonium sulphate for comparison with other plots getting artificial manures, but the yield of cotton was only 164 lbs. even less than in other artificial manure plots and the yield of Jowár is 1,318 lbs. of grain and 3,682 lbs. of Kadbi which is nearly equal to other artificial manure plots.

Rotation and manurial experiments.

10. As noted in last year's report the old cropping scheme of the permanent series of experiments (in old Panas area) was abandoned. Series I was sown throughout with Jowár, while Series II was sown throughout with cotton except the first four plots, half of each of which was treated differently and the yield

of these plots was therefore calculated on half their area. Similarly in the year under report Series I was cropped throughout with cotton and Series II with Jowár except in the case of plots 1, 2, 11, 14, 24 and 25, the northern halves of which were treated differently; and hence the results of these plots are calculated from the yield obtained on their southern halves.

No manure was given to any of the plots. The plots were all even and uniform in growth.

Cotton suffered from want of moisture on account of scant rain. It also suffered from 'Dahido,' a mite (Phytoptus).

The results are tabulated below but the review is published separately:—

Series I (Cotton).

Serial letter of rotation.	No. of plot.	Crops of the rotation.	Yield per acre. Seed-cotton.	Yield per acre. Stalks.	Previous manurial treatment.
			Lbs.	Lbs.	
A	1	Jowár ...	284	976	5 tons of farm yard manure to each plot every 2 years.
	2	Cotton ...	313	1,152	
B	3	Jowár and Tuver	314	1,060	
	4	Cotton ...	318	980	
C	5	Jowár ...	301	1,084	5 tons of farm yard manure to each plot every 3 years.
	6	Tuver ...	320	860	
	7	Cotton ...	363	1,072	
D	8	Jowár ...	296	952	
	9	Fallow ...	326	900	
	10	Cotton ...	334	960	
E	11	Jowár ...	628	2,704	
	12	Fallow ...	Fallow.		
	13	Cotton ...	490	1,356	
F	14	Jowár ...	530	2,648	
	15	Fallow ...	Fallow.		
	16	Cotton ...	457	1,392	
G	17	Jowár ...	255	880	
	18	Fallow ...	226	800	
	19	Cotton ...	278	860	
H	20	Jowár ...	254	836	500 lbs. of castor cake to each plot every 2 years.
	21	Cotton ..	247	736	
I	22	Jowár ...	272	960	5 tons of poudrette to each plot every 2 years.
	23	Cotton ...	252	1,028	
J	24	Jowár ...	252	680	No manure.
	25	Cotton ...	437	976	

Series II (Jowar).

Serial letter of rotation.	No. of plot.	Crop of the rotation.	Yield per acre.		Previous manurial treatment.
			Grain.	Kadbi and chaff.	
			Lbs.	Lbs.	
A	1	Jowár ...	1,112	2,239	5 tons of farm yard manure to each plot every 2 years.
	2	Cotton ...	1,190	2,208	
B	3	Jowár and Tuver.	1,371	3,259	
	4	Cotton ...	1,487	3,383	
C	5	Jowár ...	1,344	3,540	5 tons of farm yard manure to each plot every 3 years.
	6	Tuver ..	1,432	2,872	
	7	Cotton ...	1,496	3,376	
D	8	Jowár ...	1,332	3,520	
	9	Fallow ...	1,316	2,876	
	10	Cotton ...	1,532	4,428	
E	11	Jowár ...	1,764	4,453	5 tons of farm yard manure to each plot every 3 years.
	12	Fallow ...	Fallow.		
	13	Cotton ...	1,754	4,400	
F	14	Jowár ...	1,826	4,245	
	15	Fallow ...	Fallow.		
	16	Cotton ...	1,799	4,403	
G	17	Jowár ..	1,394	3,442	
	18	Fallow ...	1,250	2,877	
	19	Cotton ...	1,659	3,992	
H	20	Jowár ...	1,304	2,948	500 lbs. of castor cake to each plot every 2 years.
	21	Cotton ...	1,324	3,192	
I	22	Jowár ...	1,710	3,793	5 tons of poudrette to each plot every 2 years.
	23	Cotton ...	1,745	3,770	
J	24	Jowár ...	962	1,908	No manure.
	25	Cotton ...	1,171	2,598	

11. A new manurial experimental series with its duplicate was laid out in the newly acquired area of Bhathár in order to avoid the end error as already pointed out in the report for 1904-05 and further confirmed last year by taking the yields of each row or a

set of rows of each plot separately. The plots were made broader and shorter than the old series. Even this precaution was found insufficient and the whole series has this year been recast, each plot being protected from external influence by a protective ring plot 6′ wide surrounding it. As the area was altogether a new one acquired only just before the rains, no manures were applied and no other treatment was given to the plots, but as was expected the yields differ in several cases owing probably to the previous cropping and treatment of the owners. The results are given below as showing what a good cultivator would have got from this land in its present condition and as indicating also the large differences in yield of various crops within a small area and the consequent difficulty that must always be met with in attempting to ascertain the average state of a crop in a district, in a táluka or even in a village.

Serial No. of rotation.	No. of plot.	Crop.	New Series I. Yield per acre. Grain.	New Series I. Yield per acre. Stalks and chaff.	New Series II. Yield per acre. Grain.	New Series II. Yield per acre. Stalks and chaff.
			Lbs.	Lbs.	Lbs.	Lbs.
I	1	Cotton ..	279	910	93	790
II	2	Jowár ..	860	2,950	970	2,400
III	3	Tuver ...	464	1,414	273	1,300
IV	4	Tal ...	Did not germinate.		107	230
V	5	Cotton ..	186	1,040	155	840
	6	Jowár ...	1,565	3,860	1,070	2,380
VI	7	Cotton ..	151	620	134	650
	8	Jowár ...	1,520	3,470	1,130	2,520
VII	9	Cotton ...	175	585	152	1,090
	10	Jowár ..	1,418	3,396	1,080	2,510
VIII	11	Cotton ...	116	595	208	870
	12	Tuver ...	260	1,083	366	1,090
IX	13	Cotton ...	183	770	264	930
	14	Tal ...	227	460	191	495
X	15	Cotton ...	108	670	197	850
	16	Jowár ...	800	2,040	760	1,810
		Tuver ...	65	304	27	131

Serial No. of rotation.	No. of plot.	Crop.	New Series I. Yield per acre. Grain.	New Series I. Yield per acre. Stalks and chaff.	New Series II. Yield per acre. Grain.	New Series II. Yield per acre. Stalks and chaff.
			Lbs.	Lbs.	Lbs.	Lbs.
XI	17	Jowár ...	977	2,738	810	2,240
	18	Tuver ...	288	1,166	210	780
XII	19	Jowár ...	1,117	2,921	740	2,260
	20	Tal ...	205	416	182	397
XIII	21	Jowár ...	903	2,471	860	2,290
		Tuver ...	27	86	3	41
	22	Tal ...	214	4,355	219	480
XIV	23	Tuver ...	369	1,392	261	920
	24	Tal ...	175	369	235	580
XV	25	Cotton ...	344	960	273	800
	26	Fallow ...	Fallow.		Fallow.	
	27	Cotton ...	275	980	248	960
	28	Do. ...	160	1,020	160	770
	29	Do. ...	182	830	206	690
XVI	30	Jowár ...	1,227	2,948	1,480	3,710
	31	Fallow ...	Fallow.		Fallow.	
	32	Jowár ...	1,123	2,947	1,350	3,150
	33	Do. ...	820	2,200	1,330	2,580
	34	Do. ...	726	2,183	1,330	3,220
XVII	35	Tuver ...	435	1,381	374	1,400
	36	Fallow ...	Fallow.		Fallow.	
	37	Tuver ...	333	1,266	261	1,240
	38	Do. ...	216	1,036	112	1,070
	39	Do. ...	275	1,293	192	1,100
XVIII	40	Tal ...	261	512	149	507
	41	Fallow ...	Fallow.		Fallow.	
	42	Tal ...	240	542	271	677
	43	Do. ...	234	501	271	612
	44	Do. ...	212	468	223	535
XIX	45	Cotton ...	238	700	169	760
	46	Jowár ...	1,030	3,310	1,260	3,220
XX	47	Cotton ...	112	770	103	960
	48	Jowár ...	1,050	3,100	1,160	3,160

Serial No. of rotation.	No. of plot.	Crop.	New Series I. Yield per acre. Grain.	New Series I. Yield per acre. Stalks and chaff.	New Series II. Yield per acre. Grain.	New Series II. Yield per acre. Stalks and chaff.
			Lbs.	Lbs.	Lbs.	Lbs.
XXI	49	Cotton ...	110	980	114	740
	50	Jowár ...	1,200	2,830	1,320	3,240
		Tuver ...	24	129	2	27
XXII	51	Cotton ...	133	780	...	...
	52	Jowár ...	1,300	3,100	...	...
XXIII	53	Cotton ...	111	760	...	...
	54	Jowár ...	1,180	2,810	...	...
XXIV	55	Cotton ...	110	700	...	...
	56	Jowár ...	1,210	2,880	...	...

12. An attempt was made to demonstrate the toxic effect of Jowár roots when used as manure by manuring with this material small areas (about a yard square) lying in a plot otherwise treated naturally. Both cotton and Jowár failed on the spots containing Jowár roots. It is probable that the almost universal practice of collecting and burning Jowár stubble in the fields constitutes an attempt to obviate this toxic effect. The whole question forms the subject of a separate publication.

Cultural experiments.

13. The plots under deep and shallow cultivation of last year were continued this year, with the change that the plots under Jowár last year were sown with cotton in the year under report and those under cotton were sown with Jowár.

The results were as under :—

Cultivation.	Yield per acre. Seed cotton.	Yield per acre. Jowár. Grain.	Yield per acre. Jowár. Kadbi.
	Lbs.	Lbs.	Lbs.
Deep cultivation	307	910	2,460
Shallow cultivation	411	882	2,340

In the case of cotton the deeply cultivated part apparently absorbed more moisture than was required for a young cotton crop when grown according to local custom and hence most of the plants died on account of too much moisture and this part had to be resown, while the crop on the shallow cultivated area survived. Hence the difference in yield.

In the case of Jowár the results are better in the deep cultivated plot than those in the shallow cultivated plot, as Jowár plants can withstand more moisture than cotton plants.

Possibly by sowing the cotton at a longer interval after rain a good stand might be obtained; in this way only can a real test be made.

14. A set of plots under cotton and Jowár was set aside to ascertain the most suitable distance at which they should be sown.

The results were as under :—

Jowár.				Cotton.	
No. of Plot.	Yield per acre.		Distance between rows.	No. of Plot.	Yield of Seed cotton per acre.
	Grain.	Kadbi.			
	Lbs.	Lbs.			Lbs.
21 A ...	1,933	4,212	18″	21 B	314
22 A ...	2,038	4,274	22″	22 B	337
23 A ...	1,929	3,470	28″	23 B	415
24 A ...	2,172	3,700	32″	24 B	392
24 C ...	2,027	3,688	36″	24 D	493

The plots were under a green manurial series last year but owing to unfavourable conditions the land was practically fallow except plot 23A which produced a middling crop of Udid which however was not ploughed in. Spacing has had little effect on Jowár, but the quality of Kadbi in the wide spaced plots is poor, being thick stemmed. In the case of cotton the wider the spacing the greater the yield under the conditions of the experiment.

15. *Groundnut* under irrigation treated differently gave the following results :—

Yield of Groundnut varieties obtained during 1906-07.

Serial No.	No. of sub-plot.	Name of variety.	Area sown in gunthas.	Treatment given.	Yield per plot.	Value of yield per plot.	Yield per acre.	Value of yield per acre.	Percentage of seed to husk.	Percentage of oil in seed.	Cost of harvesting the crop per acre.	Object of the Experiment.	Remarks.
					Lbs.	Rs. a. p.	Lbs.	Rs. a. p.			Rs. a. p.		
	A	Pondicherry ...	9/25	Inoculated; 1′ apart; ammonium sulphate 100 lbs. per acre.	19	1 3 2	1,706	106 9 6	72·9	48·3	52 15 11	To see whether inoculation does any good or not and to test the effects of ammonium sulphate on groundnut as manure.	Plant spreading; leaves dark-green; nuts lie deep and scattered in the soil more near the roots. Ammonium sulphate, though found beneficial in other cases, did not give good results in this case, as some of the nuts were eaten away from the adjoining Jowár plot.
	B	Do. ...	9/25	Inoculated; 1′ apart; no manure.	34	2 1 7	2,983	184 1 4	...	...	...		
	C	Do. ...	9/25	Not inoculated; 1′ apart; ammonium sulphate 100 lbs. per acre.	15	0 15 1	1,344	84 0 5	...	...	...		
	D	Do. ...	9/25	Not inoculated; 1′ apart; no manure.	34	2 2 2	3,033	189 9 4	...	...	...		
2	A	Spanish peanut.	1	Inoculated; 1′ apart; ammonium sulphate 100 lbs. per acre.	30	1 14 1	1,205	75 5 0	72·9	47·3	16 12 9	The same as above and also to see whether close planting is beneficial in the case of Japanese small and Spanish peanut, the two erect varieties.	Plant erect; leaves pale-green; nuts formed near the surface and all near the roots. Ammonium sulphate gave on an average 220 lbs. of nuts per acre. Wide planting gave better results than close planting, about 180 lbs. more per acre.
	B	Do. ...	1	Inoculated; 1′ apart; no manure.	23	1 6 10	911	56 15 3	...	...	...		
	C	Do. ...	1	Inoculated; 6″ apart; ammonium sulphate 100 lbs. per acre.	28	1 12 1	1,125	70 5 0	...	...	...		
	D	Do. ...	1	Inoculated; 6″ apart; no manure.	21	1 4 10	831	51 15 3	...	...	...		
	E	Do. ...	1	Not inoculated; 1′ apart; ammonium sulphate 100 lbs. per acre.	33	2 0 10	1,311	81 15 3	...	...	...		
	F	Do. ...	1	Not inoculated; 1′ apart; no manure.	31	1 14 10	1,231	76 15 3	...	...	...		
	G	Do. ...	1	Not inoculated; 6″ apart; ammonium sulphate 100 lbs. per acre.	27	1 11 6	1,096	68 8 0	...	...	...		
	H	Do. ...	1	Not inoculated; 6″ apart; no manure.	22	1 6 1	885	55 5 0	...	...	...		

3	A	Japanese small.	1	Inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	23	1 7 0	920	57 8 0	75·0	50·4	9 9 0	The same as above and also to see whether close planting is beneficial in the case of Japanese small and Spanish peanut, the two erect varieties.	Plant erect; leaves pale-green; nuts formed near the surface and all near the roots. Ammonium sulphate gave on an average 67 lbs. more per acre. Close-planting gave on an average 240 lbs. yield more per acre than wide planting 1 foot apart.
	B	Do. ...	1	Inoculated; 1' apart; no manure.	20	1 4 0	800	50 0 0	...	...	...		
	C	Do. ...	1	Inoculated; 6" apart; ammonium sulphate 100 lbs. per acre.	28	1 12 0	1,120	70 0 0	...	...	...		
	D	Do. ...	½	Inoculated; 6" apart; no manure.	14	0 14 0	1,120	70 0 0	...	...	...		
	E	Do. ...	1⅓	Not inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	23	1 7 0	767	47 14 8	...	...	...		
	F	Do. ...	1⅓	Not inoculated; 1' apart; no manure.	22	1 0	783	43 13 4	...	...	...		
	G	Do. ...	1⅓	Not inoculated; 6" apart; ammonium sulphate 100 lbs. per acre.	31	1 15 0	1,033	64 9 0	...	...	...		
	H	Do. ...	7/10	Not inoculated; 6" apart; no manure.	16	1 0 0	914	57 2 3	...	...	...		
4	A	Virginia ...	2	Inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	98	6 2 0	1,960	122 8 0	74·1	47 2	64 7 3	To see whether inoculation does any good and to test the effects of ammonium sulphate and lime as manure on groundnut. Also to see the effect of lime on the sticky black soil containing carbonates.	Plant spreading; leaves dark-green; nuts lie deep and scattered but more near the roots. Ammonium sulphate gave on an average 370 lbs. of nuts per acre. Part treated with lime yielded on an average 180 lbs. more per acre.
	B	Do. ...	1	Inoculated; 1' apart; lime 2½ tons per acre.	41	2 0	1,640	102 8 0	...	...	...		
	C	Do. ...	1	Inoculated; 1' apart; no manure.	34	2 2 0	1,360	85 0 0	...	...	...		
	D	Do. ...	2	Not inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	111	6 15 0	2,220	108 12 0	...	...	...		
	E	Do. ...	1	Not inoculated; 1' apart; lime 2½ tons per acre.	54	3 6 0	2,160	135 0 0	...	...	...		
	F	Do. ...	1	Not inoculated; 1' apart no manure.	52	3 4 0	2,080	130 0 0	...	...	...		

erial No.	No. of sub-plot.	Name of variety.	Area sown in gunthas.	Treatment given.	Yield per plot.	Value of yield per plot.	Yield per acre.	Value of yield per acre.	Percentage of seed to husk.	Percentage of oil in seed.	Cost of harvesting the crop per acre.	Object of the Experiment.	Remarks.
					Lbs.	Rs. a. p.	Lbs.	Rs. a. p.			Rs. a. p.		
5	A	Japanese large.	2	Inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	97	6 1 0	1,940	121 4 0	77·1	46·2	59 10 0	To see whether inoculation does any good and to test the effects of ammonium sulphate and lime as manure on groundnut. Also to see the effect of lime on the sticky black soil containing carbonates.	Plant spreading; leaves dark-green; nuts li deep and scattered. Ammonium sulphate yielded 640 lbs. more per acre.
	B	Do. ..	½	Inoculated; 1' apart; lime 2½ tons per acre.	20	1 0	1,600	100 0 0	...	...	...		
	C	Do. ...	1	Inoculated; 1' apart; no manure.	23	1 7 0	920	57 8 0	...	...	...		
	D	Do. ...	2⅔	Not inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	144	9 0 0	2,400	150 0 0	...	...	...		
	E	Do. ...	⅔	Not inoculated; 1' apart; lime 2½ tons per acre.	37	2 5 0	2,466	154 2 8	...	...	...		Lime yielded 500 lbs. more per acre.
	F	Do. ...	1⅓	Not inoculated; 1' apart; no manure.	64	4 0 0	2,133	133 5 0	...	...	...		
6	A	Surat local ...	2	Inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	69	4 5 0	1,380	86 4 0	69·8	46·6	59 8 4	Do. ...	Plant spreading; leaves dark green; nuts li very deep and scattered. Ammonium sulphate yielded 520 lbs. more per acre. Lime yielded 670 lbs. more per acre.
	B	Do. ...	½	Inoculated; 1' apart; lime 2½ tons per acre.	19	1 3 0	1,520	95 0 0	...	...	...		
	C	Do. ...	1	Inoculated; 1' apart; no manure.	26	1 10 0	1,040	65 0 0	...	...	...		
	D	Do. ...	2⅔	Not inoculated; 1' apart; ammonium sulphate 100 lbs. per acre.	119	7 7 0	1,700	106 4 0	...	...	...		
	E	Do. ...	7/10	Not inoculated; 1' apart; lime 2½ tons per acre.	33	2 1 0	1,855	115 15 0	...	...	...		
	F	Do. ...	1⅔	Not inoculated; 1' apart; no manure.	40	3 1 0	1,400	87 8 0	...	...	...		

					Newly introduced varieties.									
7	1	Java ...	S. ft. 150	.....	1	...	435	...	...	...	...	To compare with other varieties and to see whether they are suitable for this district or not.	Plant erect; leaves pale-green; nuts formed near the surface and mostly near the roots.
	2	East African ...	50	.....	1	...	1,366	...	...	...	...		Plant spreading; leaves dark-green; nuts lie deep and scattered.
	3	Egyptian ...	Guntha 1	.....	40	...	1,600	...	...	46·4	...		Plant spreading; leaves dark-green; nuts lie deep and scattered, but most near the roots; two plants in a hill bearing about 154 nuts; a promising variety.
	4	Brazil ...	S. ft. 350	.....	7	...	871	...	...	...	...		Plant semi-erect; leaves pale-green; nuts formed near the surface and mostly near the roots.
	5	Barbados ...	200	.....	3	...	653	...	...	...	...		Plant spreading; leaves green; nuts lie deep and scattered.
	6	Mauritius ...	300	.....	18	...	2,613	...	...	46·4	...		Same as Pondicherry; a promising variety.
	7	Mozambique ...	Guntha $6\frac{3}{10}$	.....	203	...	1,289	...	...	48·3	...		Plant spreading; leaves dark-green; nuts lie deep and scattered like Japanese big. A very promising variety.
		Senegal ...	$10\frac{2}{3}$	.....	110	...	407	...	...	45·3	...		Plant spreading; leaves dark-green; nuts lie deep and scattered. A most promising variety.
					Results of Groundnut varieties tried as kharif crops and of Groundnut treated with lime and sown in soil inoculated with Poona soil.									
8	A	Japanese small.	20	Husked groundnut drilled with an ordinary drill: unirrigated.	261	16 5 0	522	32 10 0	...	...	9 8 6	To see whether these early varieties can be grown as kharif crop, without any irrigation, as there is a greaterdemand for such kind of groundnut.	Sown on 4th July 1906; harvested on 8th November 1906; had it been possible to sow the crop at least 8 or 10 days earlier, the crop would have been still better.
	B	Spanish peanut.	20	Do. ...	295	18 7 0	590	36 14 0	...	...	8 2 0		It is also worth trying whether a 18" drill could be with advantage substituted by a 12" drill. Do. do.

Serial No.	No. of sub-plot.	Name of variety.	Area sown in gunthas	Treatment given.	Yield per plot.	Value of yield per plot.	Yield per acre.	Value of yield per acre.	Per-centage of seed to husk.	Per-centage of oil in seed.	Cost of harvest-ing the crop per acre.	Object of the Experiment.	Remarks.
					Lbs.	Rs. a. p.	Lbs.	Rs. a. p.			Rs. a. p.		
2	A	Japanese small.	7	Inoculated with Poona soil.	213	13 5 0	1,217	76 1 6	...	...	25 12 6	To see whether soil which grew diseased groundnut carries the germs of disease and to see whether lime can check the disease.	Affected to some extent with Tikka disease.
	B	Do. ...	7	Nil ...	262	16 6 0	1,497	93 9 1	...	...	25 12 6		Very little affected with Tikka disease and hence the difference in yield.
	C	Do. ...	6	Inoculated with Poona soil and treated with 840 lbs. of lime.	192	12 0 0	1,280	80 0 0	...	...	25 12 6		Affected to some extent with Tikka disease. The little higher yield is due to the addition of lime.
	A	Japanese large.	6	Unexperimental ...	113	7 1 3	775	48 7 0	...	...	33 5 4	For seed purposes only.	This plot was originally intended for sowing with Poona seed; but as the seed could not be obtained from Poona, it was sown with the varieties mentioned for seed purposes only.
	B	Spanish peanut.	7	Do. ...	186	11 9 9	1,061	66 5 5	...	...	25 14 3		
	C	Japanese small.	7	Do. ...	119	7 7 4	682	42 10 0	...	...	25 0 0		Owing to rather late sowing the yield was not satisfactory.

Note.—(1) Java, East African, Brazil and Barbados were not sent for analysis as we had only a small quantity with us.

(2) The seed in the first six varieties was inoculated with the inoculating material for groundnut received from the United States Department of Agriculture.

A study of the above statement shows that—

(1) The heaviest yielding varieties remain the same, *viz.*, Virginia, Japanese big and Pondicherry, but in the reverse order.

(2) The average yield of all the varieties is less than that of the previous year as the varieties were sown about a month later. On account of the continuous rainy season it was not possible to prepare beds for sowing; but the average yield of the heaviest yielding varieties can be safely taken at between 3,500 lbs. and 4,000 lbs. per acre under favourable conditions.

(3) The charges of harvesting the varieties have been comparatively less than those of the last year partly due to the difference in yield and mostly due to the fact that they were harvested soon after irrigation water was applied, *i. e.*, when the soil was sufficiently moist. Cultivators generally follow this system to minimize the expenditure and sell off their produce soon after it is lifted in order to secure more weight. But this practice will not suit on a farm where fully matured and dried seed has to be collected. This year's experience shows that the produce thus harvested takes several days to dry the nuts on a threshing yard.

The "lifting" charges have been less for local than for Virginia as the crop was not fully established.

(4) It will be seen from the statement that many of the foreign varieties are commercially superior to the local in having a higher percentage of seed to husk and also to a higher percentage of oil in them. In the current year the percentage of oil has remained almost the same in many of the varieties, except the Spanish peanut, where it has fallen by about 3 per cent., and in the Japanese big and local by about 1 per cent. each due mostly to the quality of the produce.

(5) Some of the foreign varieties, *viz.*, Spanish peanut, Japanese small and big, ripen much earlier than the local, *i. e.*, in about 5 to 7 weeks; other varieties, too, ripen 2 to 3 weeks earlier than the local.

On account of the early ripening qualities of the first three they can be grown as a kharif crop without any irrigation, making them most suitable for cultivators who cannot afford to irrigate or who have no wells. Two varieties, Spanish peanut and Japanese small, were tried as kharif crops, and though sown about 3 weeks later than they should have been, have yielded a fairly good outturn which can equal the good profits which can be realized from either Jowár or cotton. One more trial will be

made with these and Japanese big, also with the newly introduced most promising varieties, Senegal and Mozambique.

(6) Of the newly introduced varieties, Mozambique and Senegal seem to do best. Each of them is found to bear more than 175 nuts to a single plant, *i. e.*, nearly three times more than any of the old or newly introduced varieties.

(7) Application of lime seems to do more good in the Athva area than in the Panás area.

(8) As will be seen from the statement, the application of lime for checking Tikka disease has not given satisfactory results and a further trial seems necessary.

16. The following table compares the percentage of oil ascertained by Dr. Leather last year with that ascertained by Mr. Meggitt, Agricultural Chemist, Bombay, this year :—

Name of variety.	Percentage of oil in 1905-06.	Percentage of oil in 1906-07.
Virginia	47·21	47·21
Pondicherry	48·31	48·30
Japanese big	47·68	46·21
Japanese small	50·40	50·48
Spanish peanut	51·43	47·31
Surat Local	47·43	46·64
Egyptian	.....	46·43
Mauritius	.....	46 43
Mozambique	.....	48·32
Senegal	.....	45·36

17. Groundnut under irrigation treated with slaked lime to see if Tikka disease could be checked by it and also to see if the disease could be carried by the infected soil gave the following results :—

No. of Plot.	Area.	Name of crop.	Treatment.	Yield of Nuts per acre.
	Gunthas.			lbs.
$15A_1$ ...	0·7	Japanese small ...	Soil inoculated with Poona infected soil.	1,217
$15A_2$ ...	0·7	Do. ...	Ordinary	1,497
$15A_3$ ...	0·6	Do. ...	Soil inoculated with Poona infected soil and manured with 2½ tons of lime per acre.	1,280

Originally plots $15A_1$ and $15A_3$ were intended to be sown with diseased seed from Poona, but as the seed was not received these plots were all sown with Surat seed and the soil inoculated with Poona soil which had grown diseased groundnut for several years.

The sowing was delayed for some time in the hope of getting diseased seed from Poona and hence the very low yield.

Plots A_1 and A_3 were affected more than plot A_2 and hence the yield is less in both of them. From the above it can be said that lime does not seem to have any effect on the disease.

Similarly plot 20B was divided into three sub-plots and $20B_1$ and $20B_3$ were to be sown with Poona diseased seed but not inoculated with Poona soil. But as seed was not received the area was sown with Spanish peanut, and small and big Japanese very late in the season for the purpose of obtaining seed and hence the outturn was very poor as tabulated below:—

No. of Plot.	Area.	Name of crop.	Yield of Nuts per acre.
	Gunthas.		Lbs.
$20B_1$	0·6	Japanese large	775
$20B_2$	0·7	Spanish peanut	1,061
$20B_3$	0·7	Japanese small	682

18. *Unirrigated Groundnut*—The two early ripening erect varieties were tried as kharif crop which gave the following results:—

No. of Plot.	Area.	Variety.	Yield of Nuts per acre.	Value of produce.	Cost of production.	Charges for lifting.
	A. g		Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
35A	0 20	Japanese small ...	522	32 10 0	24 0 6	9 8 6
35B	0 20	Spanish peanut ...	590	36 14 0	22 10 0	8 2 0

N.B.—Date of sowing, 4th July 1906; of harvesting, 8th November 1906.

A cultivator would have harvested it 10 or 15 days earlier, but for seed purposes fully ripe fruits are necessary.

The above varieties, though sown about three weeks later than they should have been, have yielded a fairly good outturn and if sown earlier appear likely to prove a profitable dry-crop. Further trial will be made with these and the large Japanese, also with the newly introduced varieties, Mozambique and Senegal.

Experiments with new crops.

19. Eight new varieties of groundnut, *viz.*, Java, East Africa, Egyptian, Brazil, Barbados, Mauritius, Mozambique and Senegal, received from different parts, were tried during the year under report. Most of them naturally did not germinate well. But by observing the growth of the surviving plants and counting the number of nuts borne by each of the varieties, Mozambique and Senegal seem to be the most promising. They will all be tried during the current year under irrigation. The two best will also be tried as kharif crops.

20. The following 17 varieties of Tuver from different parts were also tried at the Station :—

(1) Bilaspur No. 1.
(2) Do. No. 2.
(3) Do. No. 3.
(4) Sambalpur No. 4.
(5) Do. No. 5.
(6) Do. No. 8.
(7) Do. No. 9.
(8) Do. No. 10.
(9) Bangalore.
(10) Variegated.
(11) Bellari No. 35.
(12) Do. No. 40.
(13) Do. No. 43.
(14) Arhar.
(15) Nadiad red.
(16) Do. white.
(17) Khándesh early.

Of these, the following having done well are to be tried this season for cross-breeding :—

(1) Bilaspur No. 1.
(2) Sambalpur.
(3) Bangalore.
(4) Nadiad.
(5) Khándesh.
(6) Local.

Of the above, Khándesh Tuver (early) was tried on a fairly large scale to see if it could be introduced in the district for mixture with Jowár and Bájri in order to minimize the trouble of the cultivator of watching the late Tuver long after the main crop

is harvested. It would also give the cultivator a sufficiently long time for preparing his fields owing to its being cut early. But the Tuver is inferior, being small grained and red in colour and there is no sale for it in the market. It yielded 442 lbs. per acre. It also took a longer time to ripen than is the case in Khándesh.

21. Nine varieties of Tal received from Poona were tried on the Station; some were eaten up after germination, while others failed to germinate, and there was no moisture left in the soil for re-sowing.

An indigenous variety of Tal known as Tali, which is grown generally as a kharif crop on light soils, was tried to see if it would pay and whether the area sown by it could be ploughed after harvest with an English plough as the crop matures in September. But the yield was very poor, 53 lbs. per acre, as the germination was defective owing to excessive moisture.

22. Saidi beans from seed received last year were also tried again, but as the seed was old they failed to germinate.

23. Chavli was also tried on the Station in the year under report. The seed was treated before sowing with inoculating material received from America. The germination and growth in the beginning were very good. But just before the flowering period the crop was badly attacked by a stem-borer and never recovered, yielding only 85 lbs. of grain per acre.

24. Four varieties of maize received from Poona were tried at the Station. Their growth and yield were not promising.

25. Ratoon rice received from the Director of Bengal entirely failed to germinate at all.

26. Four varieties of lucerne seed, *viz.*—

	Name.		Locality.
(1)	Turkestan	alfalfa	Imported,
(2)	do.	do.	Montana,
(3)	do.	do.	Texas,
(4)	do.	do.	Etah,

were received, and though sown thrice were every time eaten up by insects when the seeds were germinating or soon after germination.

27. Two hundred and seventy-nine varieties of Jowár were grown on the Station for determining their botanical characters. They grew very well. As the work of classifying is now over, only four varieties, *viz.*, Lalu, Lálio, Egyptian white and red, have been selected for sowing next season for cross-breeding and all the rest are to be discontinued.

Breeding Experiments.

28. Breeding of cotton was continued on the lines previously followed.

29. Preliminary experiments in breeding on Jowár were also made this year, but as the work was commenced late it was confined to an investigation of the process of pollination as it occurs naturally in the field.

Pests.

30. During the year under report all the cotton crop on the Station as well as in the district was attacked by a disease locally known as "Dahido"—a mite.

Another disease which made its appearance on the Station was the stem-borer in Chavli.

Young seedlings of Tal were in some cases attacked and eaten up by a kind of caterpillar.

Boll-worm, the common disease, was also present to a greater or less extent.

There were casual attacks on young Jowár plants by beetles and on the little advanced plants by sugar-borer.

Irrigation Experiments.

31. These experiments, started last year, with Broach Deshi cotton and lucerne were carried during the year under report with slight modifications, *viz.*, (1) last season half the area under Broach cotton was watered twice after the rains ceased, while the other half received no artificial watering. In the season under report the area was divided into 3 parts. One of these received 3 waterings, the second two waterings and the third no watering after the cessation of the rains. (2) In the case of lucerne the interval of 20 days between waterings was changed to 30 days.

32. The results of cotton are given below :—

No. of Plot.	Area.	Date of sowing.	Dates of watering.			Yield per acre of seed cotton.	Remarks.
			1st.	2nd.	3rd.		
	A. g.					Lbs.	
19B	0 20	26th June 1906.	None ...	None ...	None ...	329	The plots were in full flower at the time of the 2nd watering; the 3rd watering was given when the fruits were forming.
20A (1)	0 10	Do. ...	6th November 1906.	25th November 1906.	.....	339	
20A (2)	0 10	Do. ...	3rd November 1906.	22nd November 1906.	10th December 1906.	614	

It will be seen that the yield in the unirrigated plot is nearly the same as in the twice irrigated plot, a result quite contrary to that of last year when under a rainfall of only 20″ the twice irrigated plot yielded 3½ times as much as the unirrigated one. The watering appears to have been most effective when the bolls are forming.

The plots were very even in germination and the difference in yield is only due to irrigation water applied.

33. The results with lucerne are shown below :—

No. of Plot.	Area.	Crop.	Date of sowing.	Interval between waterings.	Yield per acre.	Value of produce per acre.	Remarks.
	A. g.				Lbs.	Rs. a. p.	
14a	0 6⅔	Lucerne ...	18th October 1905.	15 days ...	30,668	383 5 7	Seed inoculated and sown on ridges.
14b	0 6⅔	Do. ...	Do. ...	Do. ...	22,056	275 11 2	Seed uninoculated and sown on ridges.
14c 1	0 7½	Do. ...	October 1904 ...	Do. ...	24,389	304 13 9	Compare with 14c 2.
14c 2	0 7½	Do. ...	Do. ...	30 days ...	18,289	228 9 9	Compare with 14c 1.
14d	0 9½	Do. ...	18th October 1905.	15 days ...	28,164	352 0 9	Duplicate of 14a.
14e	0 7 7/10	Do. ...	Do. ...	Do. ...	23,148	289 5 7	Duplicate of 14b.
14f	0 9	Do. ...	16th October 1905.	Do. ...	19,289	241 1 0	Seed inoculated and sown in beds.

It will be seen from the above that though the seed inoculated last year failed to give the highest results that year, still it has given the highest results this year.

It will also be seen that plots receiving irrigation every 15 days have yielded much better than the plot receiving irrigation water every 30 days, and that the lucerne sown on ridges does far better than that sown in beds. It is also less liable to disease than that sown in beds. Established lucerne appears to give much better results in the 2nd year than in the year of sowing.

34. The following statement shows the outturn of Guinea-grass and fodder Jowár (both irrigated). Guinea-grass has been grown from 1898-99 and fodder Jowár has been added for comparison only since 1905-06.

Year.	Yield per acre.		Value of Guinea-grass.	Cost of production of Guinea-grass.	Value of fodder Jowár.	Cost of production of fodder Jowár.
	Guinea-Grass.	Fodder Jowár.				
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1898 99 ...	28,580	...	190 8 0	172 6 0	.....	.....
1899-1900 ...	29,546	...	196 15 6	116 0 7	.....	.....
1900-01 ..	42,594	...	212 15 6	169 11 2	.....	.....
1902-03 ...	29,341	...	146 11 3	175 1 4	.....	.....
1903-04 ...	25,835	...	172 3 9	175 13 0	.....	.....
1904-05 ...	13,972	...	93 2 4	166 15 9	.....	.....
1905-06 ..	18,618	19,240	124 1 4	193 9 9	128 4 6	58 15 7
1906-07 ...	13,484	8,136	89 14 0	113 7 0	54 4 0	44 4 9

The Guinea-grass plot was specially planted in the Athva area near the buildings to remove the excess of water from the manure pit and so long as it was kept there and received liquid manure from the manure pit the yield was good. But when the plantation was removed elsewhere to compare its yield with a plot of fodder Jowár the Guinea-grass proved inferior to the latter.

It will be seen from the statement that depriving Guinea-grass of liquid manure has reduced the yield to less than half. Of the total yield, nearly two-thirds is produced in the monsoon season when there is no necessity for this grass. The raising of a Jowár crop is apparently much more profitable to a cultivator than growing Guinea-grass. It is also not advisable for a cultivator to cultivate Guinea-grass which does not give him green fodder in fair weather when he requires it.

The yield of Jowár in the year under report was less because it was grown on the same plot as that of 1905-06. No manure was given either to Jowár or Guinea-grass.

The experiment is considered to be conclusive and is discontinued.

Measurements of irrigation water applied to crops.

35. These experiments as planned out last year with the objects stated in paragraph 18 of the last year's report were

continued during the current year. The results may be summarised as under :—

(1) That crops like lucerne, groundnut, &c., grown on the black soil of Surat either in beds or on ridges require irrigation water equal to between 4 to 5 inches of rainfall after a month or a month and a half from the time the rains stop, and that subsequent waterings are required at intervals of 15 days equal to 2 to 3 inches of rainfall. But should irrigation be given only once a month instead of every 15 days then an application equal to 3″ to 4″ of rainfall should be given. As the season advances and the temperature goes up a heavier application will be found necessary so that in the hot weather an increase equal to 1″ of rainfall over the ordinary cold weather amount should be given.

In the case of drilled Deshi cotton two to three months after the rains cease, when the soil has not cracked so badly as it does later on in the hot season, irrigation water for the first watering equals 5½ to 6½ inches of rainfall and the subsequent waterings at intervals of twenty days require water equal 3 to 3½ inches of rainfall.

Trials with new implements.

36. Two iron hand-gins and three iron 'mots' (buckets for raising water) were tried on the Station during the year under report with the following results :—

The iron hand-gins were received from the Inspector-General of Agriculture in India. They are on the principle of McCarthy gins, but have no moveable knives and the roller is studded with small pins. Every effort was made to get them to work, but the cotton always stuck to the roller and was gradually chopped into fine particles.

Of the two iron 'mots,' one was received from Násik and another from Belgaum.

The first worked like the Sundhia leather 'kos' with the only defect that it took a very long time to fill. This makes it useless. The price is Rs. 9.

The second from Belgaum weighs 50 lbs., *i.e.*, double the weight of an ordinary 'kos.' It is circular in shape and though it works well if cautiously used, it has some drawbacks, *viz.*,

(1) that when the bullocks go a little further than the stopping point, the whole adjustment of the frame with the lower pulley is upset; (2) that the price of this 'kos' is Rs. 15, *i.e.*, the same as of the leather one. Unless it shows more durability than the leather 'kos' it is not profitable.

Manurial Experiments made off the Station on cultivators' fields.

37. Experiments on the effect of nitrate of soda, crude nitre and ammonium sulphate on rice were performed on cultivators' fields in the villages of At and Amalsad, táluka Jalálpor, and on rice in the village of Shiker, táluka Bárdoli.

The results of rice experiments are tabulated below :—

Name of the Village.	Survey No.	Area.	Manure applied.		Manure per acre.	Yield per plot.		Yield per acre.		Remarks.
			Name of manure.	Quantity applied.		Rice.	Straw.	Rice.	Straw.	
		A g.		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
Shiker.	59	0 34	Ammonium sulphate.	150	200	2,720	4,845	3,200	5,700	
	...	0 36	Nitre	150	200	3,000	5,220	3,333⅓	5,800	
	...	0 32	No manure	...	...	2,230	4,320	2,787½	5,400	
Amalsad.	450	0 9	Nitre	60	200	460	502	2,044⅔	2,231⅓	
	419	0 6	No manure	...	...	200	262	1,333⅓	1,746⅔	
	433	0 20	Sodium nitrate ...	100	200	1,000	1,095	2,000	2,190	
	38 to 41 & 54 to 57	0 23	Nitre	150	200	1,040	1,140	1,600	1,754	
	433	0 20	No manure	...	...	700	862	1,400	1,724	
At.	9	0 16	Nitre	100	200	1,000	960	2,500	2,400	This crop at At was attacked by the "rice hispa" and hence though the growth was good the results are unreliable.
	...	0 10	No manure	...	...	680	525	2,720	2,100	
	...	0 9	Sodium nitrate ...	50	200	620	615	2,755⅔	2,733⅓	
	197	0 32	Ammonium sulphate.	175	200	960	1,155	1,200	1,443¾	
	...	0 16	Nitre	100	200	760	750	1,900	1,875	
	181	0 20	Sodium nitrate ...	150	200	1,160	975	2,320	1,950	
	177	0 12	No manure	...	...	400	325	1,333⅓	1,083⅓	

The owner of the field at Shiker was much impressed on seeing the results of the manure, especially as the manured fields were in much poorer condition than the no-manure plot. He has asked for either a repetition of the experiment or a supply of manure for which he is prepared to pay. The extra yield from

the manured plots only pays for the extra expenditure incurred on the manure. Had conditions been equal the value of the extra yield would have exceeded the cost of the manure.

At Amalsad the rice crop seems to be a 12-anna one due to want of water.

38. Similar experiments with the same manures were made at the villages of Amalsad and Kachholi, táluka Jalálpor, on sugarcane. The results are tabulated below :—

Name of the village.	Survey No.	Area.	Manure.			Yield.				Value of yield per acre.	Value of manure applied per acre.	Remarks.
			Kind.	Per plot.	Per acre.	Per plot.		Per acre.				
						Gul.	Leaf bundles.	Gul.	Leaf bundles.			
		A. g.		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Amalsad.	474	0 20	Ammonium sulphate ...	200	400	3,590	1,470	7,180	2,800	462 12 0	40 0 0	
	"	0 20	No manure	...	...	3,560	1,400	7,120	2,800	459 0 0	...	
	"	0 20	Ammonium sulphate ...	200	400	3,375	2,170	6,750	4,340	443 9 2	40 0 0	
	"	0 20	No manure	...	...	2,250	1,448	4,500	2,896	295 11 8	...	No manure plot is much inferior owing to shade of trees.
	476	0 15	Sodium nitrate	150	400	2,575	1,190	6,866⅔	3,173⅓	445 0 5	28 0 0	
	"	0 15	No manure	...	...	2,525	1,180	6,733⅓	3,146⅔	436 9 0	...	
	467	0 12	Sodium nitrate	120	400	1,530	800	5,100	2,666⅔	332 1 4	28 0 0	
	"	0 12	No manure	...	...	1,620	900	5,400	3,000	352 8 0	...	
	528	0 12	Sodium nitrate	120	400	1,080	940	3,600	3,133⅓	240 10 8	28 0 0	
	"	0 12	No manure	...	...	1,215	1,060	4,050	3,533⅓	270 12 8	...	
	485	0 7	Nitre	70	400	900	576	5,142¾	3,291½	339 14 1	19 6 0	
	"	0 7	No manure	...	...	810	520	4,628½	2,971½	304 2 2	...	

	488	0	13	Nitre	130	400	1,800	980	5,538	3,015½	361	3	2	19	6	0	
	„	0	17	No manure	...	...	2,200	1,250	5,176½	2,941	338	3	9		...		
	496	0	20	Nitre	100	200	...	...	...	...	.....			9	11	0	Crop failed owing to insufficient water-supply; hence not manured 2nd time.
	„	0	20	No manure	...	...	...	...	...	...	.....				...		
Kachholi.	277	0	10	Sodium nitrate	100	400	1,260	1,[illegible]00	5,040	4,000	375	0	0	28	0	0	
	„	0	8½	No manure	...	...	1,040	800	4,894	3,764¾	324	11	2		...		
	407	0	17	Ammonium sulphate ...	200	400	4,500	1,444	10,588¼	3,397½	678	12	0	40	0	0	
	„	0	4	No manure	...	...	810	250	8,100	2,500	518	12	0		...		
	408	0	20	Ammonium sulphate ...	200	400	7,040	1,650	14,080	3,300	896	8	0	40	0	0	
	„	0	5	No manure	...	...	1,360	600	10,880	4,800	704	0	0		...		
	290	0	15	Sodium nitrate	150	400	2,200	800	5,866⅔	2,133⅓	377	5	4	28	0	0	
	„	0	15	No manure	...	...	2,000	800	5,333⅓	2,133⅓	344	0	0		...		
	403	0	12	Nitre	160	400	2,880	1,450	9,600	4,833⅓	624	2	8	19	6	0	
	„	0	12	No manure	...	...	2,600	1,425	8,733⅓	4,750	569	9	4		...		
	269	0	15	Sodium nitrate	75	200	...	...	...	...	.....			14	0	0	Came uprooted as the crop withered owing to want of water.
	„	„		No manure	...	...	...	...	...	...	.....				...		
	287	0	24	Nitre	120	200	...	...	...	...	.....			9	11	0	Manure not applied a 2nd time as the crop was too weedy and not good
	„	„		No manure	...	...	...	...	...	...	.....				...		

NOTE.—The price of Gul is Rs 2-8-0 per 40 lbs; Leaf bandles Rs. 0-8-0 per 100 lbs.

The term "no-manure plot" in the above statement is used only in contrast with the plots artificially manured. Otherwise the unmanured and manured plots have had an even treatment given by their owners which is given below against each survey number referred to in the above statement:—

Amalsad.

Survey No.	Artificial treatment given.	Treatment by the cultivator.
474	(a) Ammonium sulphate ... (b) No manure ...	Manured with farm yard manure at the rate of 35 cart-loads per acre.
	(c) Ammonium sulphate ... (d) No manure ...	Cane grown after ginger without any manure.
476	(a) Sodium nitrate ... (b) No manure ...	Green manured with San.
467	(a) Sodium nitrate ... (b) No manure ...	Top-dressed with silt from surrounding drains.
528	(a) Sodium nitrate ... (b) No manure ...	Cane grown after ginger; no manure given to cane.
485	(a) Nitre ... (b) No manure ...	Same as above.
488	(a) Nitre ... (b) No manure ...	Manured with farm yard manure at the rate of 35 cart-loads per acre.
496	(a) Nitre ... (b) No manure ...	No manure was given to the crop.

Kachholi.

277	(a) Sodium nitrate ... (b) No manure ...	Cane grown after ginger without any manure.
407	(a) Ammonium sulphate ... (b) No manure ...	No manure given.
408	(a) Ammonium sulphate ... (b) No manure ...	Green manured with Udid.
290	(a) Sodium nitrate ... (b) No manure ...	Cane grown after ginger without any manure.
406	(a) Nitre ... (b) No manure ...	Same as above.
269	(a) Sodium nitrate ... (b) No manure ...	Same as above.
287	(a) Nitre ... (b) No manure ...	No manure given by the cultivators.

Note.—In the group of garden villages the ginger crop gets the best possible treatment. It is grown in fields which are manured with green manure as far as possible; any available farm yard manure is also given and the crop is finally top dressed with castor cake at the rate of 20 to 30 maunds per acre and it is also earthed with silt from the surrounding drains. The general practice there is to grow a sugarcane crop after ginger so as to get the advantage of heavy manuring given to ginger.

In the case of Survey Nos. 467 and 528, the results of the unmanured plot are better than those of the manured plots. The difference may be due to differences in the soil which cannot be ascertained from the appearance of the crop when very young. As far as these results go they appear to indicate that of the manures tried, ammonium sulphate alone will pay.

Dairy Herd.

39. The following statement shows the strength of the dairy herd on the Surat Station :—

Description.	Strength on 31st March 1906.	Increase.			Decrease.				Strength on 31st March 1907.	Valuation.		Increase or Decrease.
		Purchased or transferred.	Born.	Total.	Sold.	Died.	Transferred.	Total.		1906.	1907.	
										Rs.	Rs.	Rs.
Stud bulls ...	3	...	...	...	2	...	...	2	1	215	125	−90
Cows ...	12	...	...	...	...	...	...	...	12	565	605	+40
Heifers ...	8	...	...	...	...	...	...	...	8	141	230	+89
Cow calves ...	6	...	6	6	...	...	...	...	12	142	222	+80
Bull calves ...	2	...	...	...	...	...	...	...	2	65	100	+35
Total ...	31	...	6	6	2	...	...	2	35	1,182	...	+154
He buffaloes ...	1	...	...	...	...	...	...	...	1	55	30	−25
She-buffaloes ...	11	3	...	3	...	...	...	...	14	575	1,010	+435
Heifers ...	1	...	...	...	...	...	1	1	...	35	...	−35
She-buffalo calves ...	8	1	2	3	...	1	...	1	10	88	114	+26
Bull buffalo calves .	9	1	5	6	6	3	...	9	6	51	80	+29
Total ...	30	5	7	12	6	4	1	11	31	804	1,234	+430
Grand Total ...	61	5	13	18	8	4	1	13	66	1,832	2,416	+584

40. The following statement shows the monthly milk yield of each cow and buffalo, average monthly milk yield and dates of calving of each animal during the year :—

Cows

No.	Month.	Names of milch cows at the Surat Station during the year 1906-07.										
		Iufani.	Mula.	Goulan.	Hirkani.	Shur'a.	Rupen.	Dilvari.	Prayág.	Chandra-bhága.	Sukhri.	Copi.
		1	2	3	4	5	6	7	8	9	10	11
		Milk yield per month.										
		Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.
1	April 1906 ...	305 8	267 0	341 8	378 8	349 4	287 0	278 8	189 0	40 0	..	..
2	May ,, ..	275 4	215 12	400 4	430 4	377 4	324 12	443 8	349 12	295 12	117 0	...
3	June ,, ...	111 4	42 8	388 12	369 8	358 4	363 8	407 8	354 12	312 4	372 12	...
4	July ,, ...	...	...	470 0	365 8	398 12	549 4	437 4	456 12	321 8	433 0	151 4
5	August ,, ..	...	...	448 12	293 8	311 4	547 4	470 0	448 4	316 12	463 8	54 2
6	September ,, ...	...	...	321 0	196 4	302 4	479 0	49 8	370 8	248 0	429 0	430 12
7	October ,, ..	...	...	287 0	18 12	205 12	468 12	224 12	362 8	237 12	426 4	434 0
8	November ,, ...	...	...	183 12	...	..	322 4	...	234 8	104 4	336 8	358 4
9	December ,, ...	...	141 12	146 14	...	...	48 12	...	...	...	323 0	344 0
10	January 1907 ..	...	354 2	135 4	...	...	...	...	...	...	328 4	309 14
11	February ,, ...	...	375 4	93 12	...	...	...	...	...	...	37 0	261 12
12	March ,, ..	...	415 12	102 0	...	..	...	...	...	...	...	320 12
	Total milk yield during the year ..	692 0	1,812 2	3,264 4	1,992 4	2,332 12	3,390 8	2,511 0	2,767 0	1,871 4	3,260 4	2,965 6
	Average milk yield per month ...	230 10½	258 13¾	272 0⅓	284 9⅔	337 4	376 11⅚	358 11⅔	345 14	233 14½	326 0⅔	329 7⅚
	Dates of calving ...	1-4-05	17-5-05 6-12-06	30-1-06	15-1-06	10-3-06	25-3-06	5-4-06	2-2-05	10-5-05	14-5-06	13-7-06

Buffaloes.

No.	Month.	Names of Milch buffaloes at the Surat Station during the year 1906-07.													
		Facheri.	Bhori.	Khandi	Koyna.	Málan.	Bena.	Gajra.	Bilor.	Bhinghár	Itcha.	Sarja.	Asmáni.	Sugoona	Gahima
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Milk yield per month.													
		Lbs. ozs	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.
1	April 1906	107 4	214 8	257 12	71 8	287 8	236 8	351 4	330 0	370 0	320 8	...	...	.....	.....
2	May ,, ...	64 0	80 12	206 12	...	89 0	48 12	335 4	363 12	385 4	430 4	...	...	.....	.....
3	June ,, ...	...	...	47 8	...	...	...	298 8	319 8	346 0	437 4	...	...	.....	.....
4	July ,, ...	...	...	...	...	...	...	294 8	217 8	414 12	425 0	...	...	.....	.....
5	August ,, ...	...	...	...	290 8	30 8	...	246 4	189 8	323 12	295 4	...	...	.....	.....
6	September ,, ...	65 12	24 0	240 4	447 8	254 12	54 0	152 0	110 0	217 4	281 8	253 0	...	.....	.....
7	October ,, ...	330 0	285 8	302 12	406 4	385 4	339 12	11 4	55 12	150 8	259 4	354 8	160 8	.....	.....
8	November ,, ...	337 4	357 12	372 12	359 8	339 4	328 0	...	...	97 8	213 0	254 0	388 4	.....	.....
9	December ,, ...	310 4	348 8	360 8	370 12	321 4	343 12	...	...	86 13	190 4	257 4	283 4	.....	.....
10	January 1907 ...	263 4	348 12	351 8	345 8	317 4	378 8	...	...	77 8	198 4	251 0	245 2	256 14	209 6
11	February ,, ...	179 0	302 0	273 0	270 4	207 4	296 4	...	...	15 8	159 12	217 0	127·12	335 12	459 0
12	March ,, ...	158 4	327 12	344 8	230 8	269 0	251 0	...	...	...	99 12	226 4	77 0	406 4	501 8
	Total milk yield during the year ...	1,815 0	2,289 8	2,747 4	2,792 4	2,564 0	2,279 8	1,689 0	1,586 0	2,484 12	3,829 0	1,523 0	1,281 14	998 14	1,169 14
	Average milk yield per month... ...	201 10½	254 6⅔	274 11⅔	310 4	256 6⅔	253 4⅔	241 4⅔	226 9½	225 14 2/11	277 6⅔	217 9½	213 10½	332 15½	389 15⅓
	Dates of calving ...	18-7-05 18-9-06	19-9-05 23-9-06	17-8-05 5-9-06	20 8-05 5-8-06	26-8-05 17-8-06	10-10-05 10-9-06	9-11-05	24-11-05	29-12-05	19-3-06	5-9-06	11-10-06	Newly purchased with calves.	

41. The results of the experiment conducted to see if milk yield can be increased by different fodder stuffs are tabulated below:—

Name of the animal.	Date of calving.	Cotton-seed.	Oil-seeds.	Gavar.	Salt.	Average milk yield per day.	Guinea grass.	Lucerne.	Jowar fodder.	Kadbi.	Hay cut early.	Hay cut late.	Yield of milk per day. Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Remarks.
		lbs.	lbs.	lbs.	lbs.	lbs.oz.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	
Buffaloes.		From 15th February 1907 to 2nd March 1907.											15th		16th		17th		18th		19th		20th		February 1907
1. Khandi ...	5th September 1906.	3	2	2	·2	10 8	...	...	...	7	...	8	6 4	4 0	5 8	4 12	5 8	4 8	5 12	12 4	6 0	5 0	6 8	4 8	
2. Sagoona .	25th December 1906.	3	3	3	·2	10 9	...	...	...	7	...	8	7 8	6 0	7 4	6 8	7 8	6 0	6 12	12 6	7 0	1 8	2 12	...	
3. Gahina ...	14th January 1907.	3	3	3	·2	17 1	...	...	...	7	...	8	10 0	8 4	9 0	8 8	10 0	8 0	10 8	8 8	9 0	8 0	10 8	7 4	
Cow.																									
4. Mula ...	7th December 1906.	3	3	3	·2	13 15	...	...	...	7	...	8	8 8	5 8	4 8	7 12	8 0	5 0	7 8	8 6	8 8	5 8	8 0	5 8	
Buffaloes.		From 3rd March to 21st March 1907.											21st		22nd		23rd		24th		25th		26th		February 1907.
1. Khandi...	7th December 1906	3	3	3	·2	11 8	...	15	...	15	...	...	5 8	4 8	5 12	4 12	6 0	4 12	6 4	5 0	5 8	4 12	5 8	4 12	
2. Sagoona .	Do. ...	3	3	3	·2	13 9	...	...	15	...	...	15	2 0	3 4	2 8	3 8	6 8	4 0	6 12	4 8	6 8	5 0	7 0	5 0	
3. Gahina ...	Do. ...	3	3	3	·2	17 11	...	...	15	...	15	...	9 4	9 8	10 8	8 0	9 12	8 0	11 0	...	16 0	...	18 0	...	
Cow.																									
4. Mula ...	7th December 1906.	3	3	3	·2	14 1	...	15	...	...	...	15	7 0	5 8	8 4	5 8	9 4	7 6	8 0	6 4	7 0	6 4	8 0	6 8	
Buffaloes.		From 22nd March 1907 to 24th March 1907.											27th		28th		1st		2nd		3rd		4th		March 1907.
1. Khandi ..	7th December 1906.	3	...	...	1	...	...	...	...	7	...	8	5 12	4 8	6 0	4 8	7 0	4 8	7 0	...	10 4	...	10 0	...	
2. Sagoona .	Do. ...	3	...	...	1	...	...	...	...	7	...	8	7 0	5 0	7 0	5 4	7 8	5 4	7 12	6 0	7 8	6 0	7 4	7 0	
3. Gahina ...	Do. ...	3	...	...	1	...	...	...	...	7	...	8	16 8	...	16 6	...	16 8	...	17 0	...	16 12	...	18 0	...	
Cow.																									
4. Mula ...	7th December 1907.	3	...	...	1	...	...	...	...	7	...	8	8 12	6 4	8 0	5 12	8 0	7 8	8 4	5 8	9 0	7 4	8 4	6 12	

Buffaloes.		24th March 1907 to 8th April 1907.												5th		6th		7th		8th		9th		10th		March 1907.
1. Khandi...	5th September 1906.	3	3	3	·2	11	5	...	...	...	7	...	8	10	0	4	12	6	4	4	12	6	8	5	4	7	4	6	8	7	0	5	0	7	0	4	0	
2. Sagoona .	25th December 1906.	3	3	3	·2	12	13	...	...	...	7	...	8	8	0	6	0	7	12	6	8	8	0	6	4	7	8	6	8	8	12	4	8	7	12	5	4	
3. Gah'na ...	14th January 1907.	3	3	3	·2	15	0	...	...	...	7	..	8	11	8	...		16	8	...		19	8	...		15	12	...		18	4	...		18	0	...		
Cow.																																						
4. Mula ...	7th December 1906.	3	3	3	·2	11	0	...	...	...	7	...	8	8	4	4	4	8	12	6	12	7	8	7	0	8	8	4	12	7	4	5	0	9	8	5	12	
Buffaloes.		8th April 1907 to 14th April 1907.												11th		12th		13th		14th		15th		16th		March 1907.
1. Khandi...	7th December 1906.	3	3	3	·2	10	15	...	15	...	15	...	...	7	8	4	8	7	0	5	8	7	0	4	12	7	0	4	12	7	4	4	8	6	12	4	8	
2. Sagoona .	Do. ...	3	3	3	·2	12	3	...	15	...	...	...	15	7	8	4	8	8	4	4	2	8	4	5	0	8	0	5	0	8	0	5	4	7	8	5	8	
3. Gahina ...	Do. ...	3	3	3	·2	14	12	...	15	...	...	15	...	18	8	...		16	12	...		16	8	...		15	8	...		17	4	...		15	0	...		
Cow.																																						
4. Mula ...	7th December 1906.	3	3	3	·2	11	13	...	15	...	...	...	15	7	12	6	4	8	4	6	0	9	0	5	8	8	4	4	0	8	8	6	0	7	8	6	8	
Buffaloes.		14th April 1907 to 30th April 1907.												17th		18th		19th		20th		21st		22nd		March 1907.
1. Khandi...	7th December 1906.	3	3	3	·2	11	0	...	...	...	7	...	8	5	4	4	8	6	4	5	4	6	8	5	0	6	0	4	12	6	0	5	0	6	0	4	8	
2. Sagoona .	Do. ...	3	3	3	·2	10	14	...	...	...	7	...	8	7	4	5	8	7	12	6	0	8	8	6	4	8	4	6	4	7	8	5	0	7	12	5	4	
3. Gahina ...	Do. ...	3	3	3	·2	13	2	...	...	...	7	...	8	15	8	...		15	8	...		5	12	...		15	8	...		14	8	...		16	8	...		
Cow.																																						
4. Mula ...	7th December 1906.	3	3	3	·2	11	3	...	...	...	7	...	8	7	8	4	12	8	8	5	12	7	8	5	12	4	8	5	8	7	0	4	12	6	4	5	8	
Buffaloes.														23rd		24th		25th		26th		27th		28th		March 1907.
1. Khandi...	.....	...	...	...	...	...		...	...	...	...	...	...	6	4	4	0	6	8	4	8	6	8	5	0	6	8	4	12	5	12	4	8	5	12	4	8	
2. Sagoona .	.....	...	...	...	...	...		...	...	...	...	...	...	4	8	5	0	7	0	5	0	6	12	4	12	6	0	4	12	7	0	5	8	7	0	5	8	
3. Gahina ...	.....	...	...	...	...	...		...	...	...	...	...	...	14	12	...		14	0	...		15	0	...		14	0	...		14	0	...		15	0	...		
Cow.																																						
4. Mula ...	.....	...	...	...	...	...		...	...	...	...	...	...	6	0	4	12	7	4	5	8	6	8	4	8	6	8	4	8	6	12	5	8	7	0	6	4	
Buffaloes.														29th		30th		31st		1st		2nd		3rd		April 1907.
1. Khandi ..	.....	...	...	...	...	...		...	...	...	...	...	..	6	0	4	0	6	4	4	4	6	0	4	8	5	8	4	4	6	4	4	8	6	8	4	4	
2. Sagoona .	.....	...	...	...	...	...		...	...	...	...	...	...	7	12	5	0	6	8	5	8	7	8	5	8	7	8	5	4	6	12	5	8	7	8	5	12	
3. Gahina ...	.....	..	...	...	...	...		...	...	...	...	...	...	16	0	...		14	0	...		13	8	...		12	8	...		14	4	...		15	0	...		
Cow.																																						
4. Mula ...	.....	...	...	...	...	...		...	...	...	...	...	...	8	0	5	8	7	8	6	0	7	8	5	12	...		...		6	8	5	12	7	8	6	0	

Name of the animal.	Date of calving.	Cotton seed.	Oil-seeds.	Gavár.	Salt.	Average milk yield per day.	Guinea grass.	Lucerne.	Jowár fodder.	Kadbi.	Hay cut early.	Hay cut late.	Yield of milk per day,												Remarks.
													Morning.	Evening	Morning.	Evening.	Morning.	Evening	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	
													lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	lbs.oz.	
Buffaloes.													4th		5th		6th		7th		8th		9th		April 1907.
1. Khandi ...	.....	...	...	...	...	...	...	...	...	...	...	...	6 12	4 8	6 0	4 4	6 0	4 4	6 8	4 4	7 0	...	9 0	4 8	
2. Sagoona .	.....	...	...	...	...	...	...	...	...	...	...	...	7 8	5 8	7 4	5 0	6 8	4 8	6 12	4 12	7 8	4 12	6 12	5 0	
3. Gahina ...	.....	...	...	...	...	...	...	...	...	...	...	...	15 4	...	14 0	...	14 8	...	13 12	...	15 8	...	12 12	...	
Cow.																									
4. Mula ...	.....	...	...	...	...	...	...	...	...	...	...	...	8 8	6 8	5 8	3 12	4 0	4 0	6 8	4 8	7 8	4 8	5 12	6 4	
Buffaloes.													10th		11th		12th		13th		14th				April 1907.
1. Khandi...	.....	...	...	...	...	...	...	...	...	...	...	...	7 0	4 0	6 8	5 0	6 8	5 0	6 8	4 8	6 12	4 4			
2. Sagoona .	.....	...	...	...	...	...	...	...	...	...	...	...	7 4	4 8	7 4	5 4	7 12	5 4	7 0	5 4	7 4	5 0			
3. Gahina ...	.....	...	...	...	...	...	...	...	...	...	...	...	14 0	...	13 0	...	15 0	...	14 8	...	4 12	...			
Cow.																									
4. Mula ...	.....	...	...	...	...	...	...	...	...	...	...	...	7 12	4 0	7 12	6 0	7 12	6 0	6 8	6 4	6 4	5 8			

These experiments were started to test the milk-increasing properties of the different fodders, dry and green. They were also made last year, but on account of want of sufficient green fodder at the time and other difficulties the results were not conclusive. This year, too, difficulties had to be faced The supply of green fodder did not last for the period for which they were to be made, and either the fodders had to be substituted by others or the experiment stopped. As the cattle are not box-fed the experiments have to be conducted when they do not get anything to graze outside. The fodders were given in such a way that the dry weight of the green fodders was equal. The concentrated foods remained the same as usual.

It will be seen that the fortnightly average milk yield of the four animals under trial previous to the commencement of the experiment was lbs. 10-8, lbs. 10-9, lbs. 17-1 and lbs. 13-15, respectively. The average rose during the second fortnight to lbs. 11-8, lbs. 13-9, lbs. 17-11, lbs. 15-15, respectively, for each animal. During the third fortnight the yield was nearly maintained without any green fodder except in the case of the fourth animal, which was ill for three days. During the fourth fortnight no guinea grass or green fodder was available and lucerne was given to all animals, but that too lasted only for a week, during which period the milk yield went down a little.

The yield would have showed a bigger difference when the animals were fed both with dry and green fodder if the animals were all newly calved; but such animals were not in the dairy when the experiment was conducted, as many animals at that period go dry or are nearly at the middle of their milking period.

The trial showed that no appreciable difference in milk yield was obtained by the changes of rations tried.

F. FLETCHER,
Deputy Director of Agriculture.

Poona, September 1907.

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